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Computerworld's second annual Premier 100 IT Leaders list will be published in our March 26, 2001, issue. This awards program shines a deserved spotlight on leaders from both the technology and business sides of a broad range of companies. Our list highlights those who have displayed exceptional technology leadership in their organizations, fostered ideas and creative work environments, envisioned innovative approaches to business problems and effectively managed IT strategies. Our supplement will also feature stories on hot topics facing the IT Leader today, as well as interviews with our honorees.

The Computerworld IT Leaders Index

Based on a series of in-depth interviews with top executives and industry leaders, Computerworld identified a set of common characteristics that describe successful IT Leaders. We call this the Computerworld IT Leaders Index.

This index defines the IT Leader as someone who guides the effective use of information technology to improve his or her company's business performance. A Premier 100 IT Leader can be a CIO, Vice President, IS Director or Manager from any number of areas within the IT organization - network management, database management, intranet and Web management, help desk, application development, project management, contract management or procurement. IT Leaders also do the following:

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- Consider missed opportunities to be their biggest failures
- Hire creative, innovative people
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- Compare best practices with peer companies
- Leverage their technology vendors as partners

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MOST WANTED TECHIES

A rundown on the 10 IT types every recruiter is tracking down, from Web developer to security analyst. Page 40

I HIRED A HACKER

Security manager Mathias Thurman offers a job to the enemy: the hacker who cracked his system. Page 50

DO IT YOURSELF

To succeed in your career, create your own opportunities, says one IT pro. Page 42

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SPY CASE DEMOS INSIDER THREAT

FBI suspect's system use went undetected

BY DAN VERTON

The career FBI agent charged with spying last week had significant IT experience and access, underscoring the growing threat to corporate data by insiders.

The agent, Robert Philip Hanssen, was charged with spying for Russia since 1985. He allegedly gave Russian intelligence agents highly classified documents and details about U.S. intelligence sources and electronic surveillance, in exchange for an estimated $1.4 million in cash and diamonds.

According to a 100-page affidavit filed in the U.S. District Court in Alexandria, Va., Hanssen used his computer access to the FBI's Electronic Case File system, which contains classified information about ongoing FBI investigations, to check whether the FBI had been alerted to his activities.

SECURITY BREACHES

The lesson for corporate America "is that companies tend to gain a false sense of security from strong perimeter security," like firewalls and intrusion-detection systems, said Eric Friedberg, a former computer and telecommunications crime coordinator at the U.S. Attorney's Office in New York. "What goes on behind the firewall can be even more damaging be-

FBI, page 16

USERS STILL COOL TO XML FOR TRADING

Little advantage seen in moving from EDI

BY MICHAEL MEEHAN
ORLANDO

XML may be the acronym on everyone's lips, but it's still far from being part of many companies' business-to-business trading networks.

That's the view from the annual confab sponsored by GE Global Exchange Services, which was held here last week. GXS, a subsidiary of Fairfield, Conn.-based General Electric Co., is one of the world's largest electronic data interchange networks; it added XML capabilities last year.

Harvey Seegers, CEO of GXS, said the migration has been slow: Just 1% of the transactions that GXS facilitated for 100,000 companies last year used XML. He said he doesn't expect that number to rapidly increase, either.

"A lot of companies haven't decided it's more economical to go browser-based," Seegers said. "We could do it today — make that switch — but the fact is, customers don't want to do it that way."

Chris Maxwell, an e-commerce systems manager at Purchase, N.Y.-based PepsiCo Inc., said the food and beverage world is still rooted in EDI transactions.

"Right now, XML doesn't look like a viable solution in our production environment," said Maxwell, adding that she

XML, page 71

Why the Wavering?

Some of the reservations about the tagging language:

Why switch from a system that already works? Many companies have established EDI networks.

Where are the standards? Some are leery of adopting XML as a trading vehicle before standards similar to EDI's X.12 and EDIFACT are developed.

How about ROI? XML-based markets have yet to reach critical mass, making the value of investments dubious.

WHERE RITE AID WENT WRONG

Rite Aid Corp.'s 500-member IT staff is trying to recover from a staggering array of problems, reports Kim S. Nash. First, investigators alleged the huge drugstore chain's homegrown software overcharged prescription customers who were uninsured. Then there was an inventory software disaster in 1999. And, worst of all, the company had a $1 billion loss last year, which is forcing Rite Aid — once an IT leader — to take a much more cautious approach to IT spending.

Story begins on page 38.

CHRIS HARTLOVE

DON DAVIS is in a turnaround situation as the new CIO at financially troubled Rite Aid.

CALIF. IT GIRDS FOR GRID WOES

Blackout planning modeled on Y2k prep

BY LEE COPELAND GLADWIN

The furor over the deregulation-spawned power crisis in California may have abated in recent weeks, but the havoc that it's wreaking on IT systems hasn't.

Rolling blackouts — an emergency measure aimed at stretching limited power resources by cutting electricity to specified areas in roughly two-hour blocks throughout the state — have caused several firms to dust off Y2k disaster plans and to implement other contingency efforts.

Power, page 14

NEWSPAPER

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RAOUL BENAVIDES

MASTERS OF BUSINESS INTELLIGENCE

Business intelligence software is a great idea, but it requires an army of IT pros, including data modelers, database designers and other specialists, warns Ken Buchanan of Health Risk Management in Minneapolis.
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BETTING ON WIN 2K

Microsoft promises scalability, but can a system based on Windows 2000 Datacenter Server and SQL Server 2000 deliver the level of uptime and scalability required for a serious online business?
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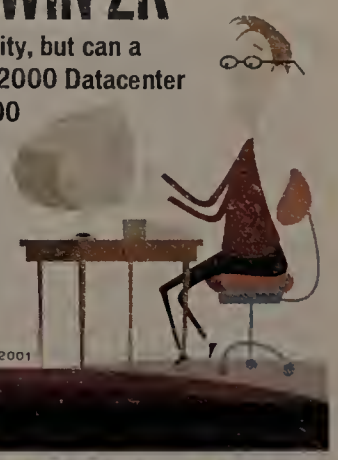

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6 HUMAN ERROR is blamed for a software driver problem that caused the modems of some laptops to freeze up on at the stroke of midnight Feb. 21.

7 BIG COMPANIES collect mountains of personal information about customers, but making the data work for them isn't a sure thing.

8 SUN REVEALS that a vulnerability in its Java software could allow an attacker to execute malicious commands on a victim's computer.

10 CHICAGO MOVES forward on planning for a metropolitan area network, called CivicNet.

12 STAPLES.COM POSTS a price of 1 cent for a briefcase but refuses to honor orders after the error is found.

12 EMPLOYERS CITE the economic slowdown as the reason they haven't hired more foreign workers, despite raised quotas on H-1B visas.

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60 NATIVEMINDS' SUPPORT software uses a natural language interface to answer customer support questions over the Web.

ONLINE

See the latest installment in **Autopsy of a Dot-com**, as we examine the demise of Ventro Corp.'s Chemdex exchange. Considered by many to be a model business-to-business exchange when it was launched two years ago, Chemdex collapsed in December. Hear from our panel of experts and from Ventro itself about what went wrong.
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Is it wise to hire a hacker? After reading how the author of this week's **Security Manager's Journal** did just that, follow the link to our online discussion forum to tell us your opinion.
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35 JIM CHAMPY announces that the time is right to make investments that take advantage of the Internet's impact.

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72 FRANK HAYES reminds us of the cardinal rule of business: A deal's a deal, no matter what.

AT DEADLINE

Upgrades Expose Data

Upgrades led to the exposure of some customer data at the Web site of a popular music club last week. New York-based Columbia House Co. confirmed reports that some customer information could have been viewed by outside users during recent upgrades, though a spokeswoman said that only customers' names and the last four digits of their credit card numbers were visible.

Sun Casts Shadow on Earnings Forecast

Sun Microsystems Inc. added to widespread financial pessimism in the technology sector last week when it cut earnings targets to well below analysts' expectations. Sun executives said they expect earnings for the company's third quarter, ending March 31, to come in at about 7 to 9 cents per share, almost 50% below analysts' predictions. Ed Zander, president and chief operating officer at Sun, pointed to the slowing U.S. economy as the main reason for the revisions.

BEA's Business Buzzing

Application server vendor BEA Systems Inc. last week reported a profitable quarter, with a 72% increase in revenue for the most recent quarter compared with the same period last year. San Jose-based BEA reported net income of $18.9 million, or 4 cents per diluted share, for the period ended Jan. 31, compared with a loss of $13.7 million for the same period last year. Revenue for the quarter grew to $256 million from $149.2 million from the year-earlier period.

Short Takes

The TULSA AIRPORT AUTHORITY in Tulsa, Okla., has joined a growing list of airports that plan to centrally manage all wireless communications on their property, including cell phones and wireless LANs. . . . Murray Hill, N.J.-based LUCENT TECHNOLOGIES INC., which is struggling to recover from massive losses and internal cutbacks, said it has lined up $4.5 billion in new credit lines and secured another $2 billion in available financing to replace an existing credit agreement.

Traders Lobby SEC for Decimalization Delay

Claim Nasdaq needs more time for switch, but so far, SEC hasn't changed schedule

BY TODD R. WEISS

CITING CONCERNS about both technology and trading changes, a 7,700-member organization of stock traders last week asked the Securities and Exchange Commission (SEC) to delay by at least three months its April 9 deadline for converting the Nasdaq Stock Market to decimal-based pricing.

The current plan, which calls for Washington-based Nasdaq to run pilot tests next month and then move to a full implementation, all within a month's time, is too tight a schedule, said Lee Korins, president and CEO of the Security Traders Association (STA) in a letter to the SEC.

Korin said in an interview last week that the New York Stock Exchange had a four-month period last year to make its transition from fractions to decimals and that Nasdaq should be given a similar amount of time. "We're not saying to stop [the conversion]," Korin said. "What we're saying is to take more time to implement it."

If another 12 weeks were added to the conversion process, he said, it would allow traders to be properly prepared and would "hardly be something to upset the whole world." Korin said he hopes to have an answer from the SEC by midweek.

Nasdaq spokesman Scott Peterson wouldn't comment directly on the letter from the Washington-based STA, but he said that officials at the stock market "expect to operate according to the schedule" set by the SEC.

"We feel confident that everyone is going to be ready," Peterson said. Under a complex rollout plan, he added, several hundred financial services firms have been mandated to do testing to prepare for the changeover. "It's not as if these people are going to be walking into it cold," he said.

John Heine, an SEC spokesman, also declined to comment on the STA's request for more time. When asked what would happen if some firms and traders aren't ready by April 9, Heine said that SEC officials "don't deal in hypotheticals."

Complex Issues

Korin said more time is needed to make the switch because Nasdaq has quotation and trading data arriving simultaneously from hundreds of market centers each day, differentiating it from the NYSE. Nasdaq has already seen large data-volume increases in the past two years, and Korin said the STA is worried that the impact of converting to decimals in such a short time frame could overwhelm the market's systems.

Octavio Marenzi, an analyst at Celent Communications LLC in Cambridge, Mass., said it's surprising that some traders are having trouble preparing for the changeover. "It is a relatively straightforward thing to do," involving updates to software code and fields to move from fractions to decimals, he said. "That's about the extent of it."

In fact, Marenzi said, switching to decimal-based pricing should be much easier than what many companies had to do to fix year 2000 problems on their systems. Instead of true technical problems, the real issue behind the extension request appears to be fear on the part of some traders that decimalization will make the market more volatile, he said.

But Larry Tabb, an analyst at Needham, Mass.-based TowerGroup, called the conversion to decimals "a big project" and said many large trading firms still haven't tested their systems for compliance and have been voicing concerns about the change.

Tabb added, though, that he isn't sure whether the current deadline really is onerous.

The NYSE completed a decimal conversion for all of the 3,525 stocks it lists on Jan. 29, following the start of a pilot program in August. The U.S. is the only major country that has continued to use fractions, and both the NYSE and Nasdaq were originally supposed to switch to decimal-based pricing by last July.

Extension, Please

A traders' group is seeking a three-month reprieve from the first test of decimal pricing on the Nasdaq Stock Market.

ORIGINAL

- First pilot of 15 stocks on March 12; second pilot of 150 stocks on March 26
- Full conversion of 6,000 stocks on April 9

PROPOSED

- Pilots start in July
- Increase to four pilots

Glitch Stops Modems on Some Late-Model Laptops

Human error cited for driver problem

BY MATT HAMBLEN

Human error is being blamed for a software driver problem that caused modems to freeze up on some late-model laptops at the stroke of midnight Feb. 21.

The problem with some modems on laptops with Windows operating systems sent teams of developers at several companies scurrying to provide online fixes, including Hewlett-Packard Co., Gateway Inc. in San Diego and ESS Technology Inc. in Fremont, Calif., which wrote the problematic software.

ESS officials and one industry analyst estimate the number of affected machines worldwide at tens of thousands.

Because the error is located in an algorithm inside the time-based software coding for Windows modem drivers, users must reset the date on their notebooks to Feb. 20 or earlier to reactivate their modems, ESS officials said.

ESS refused to say which companies use the troublesome modem driver but did say that there are several worldwide. It has posted a generic fix for four operating systems: Windows 98 Special Edition, Windows 2000, Windows Me and Windows NT.

According to an HP spokeswoman, affected models include the Pavilion N5000 and the Omnibook XE3, both of which hit the market in November. The affected Gateway model is the Solo 3350, which went on sale in September, a Gateway spokeswoman said.

Alan Promisel, an analyst at IDC in Framingham, Mass., said Gateway and HP may have sold tens of thousands of machines affected by the freeze.

When the software problem was discovered at 4 a.m. Feb. 21, teams at ESS began working to create the generic replacement driver, said Bill Wong, the company's director of marketing.

"We're over the hump with the fix, but that's only, in a sense, because it was an easy problem to fix," said Skip Effler, senior vice president of worldwide sales at ESS. "We will make all . . . efforts possible to get the drivers" customized for each customer, he added.

HP officials said they're working to find a solution that allows laptop users to use their modems with their computers set to the correct date.

Wong said the error was introduced months ago when an ESS worker updated the modems from older Windows operating systems to newer ones.

Conference Attendees: CRM Initiatives May Miss Their Marks

Warn business results not easy to attain

BY THOMAS HOFFMAN
NEW YORK

Big companies routinely collect mountains of personal information about customers in the hope that the data can be used to do targeted marketing based on individual preferences. But getting positive business results from such customer relationship management (CRM) endeavors isn't anything close to a sure thing.

Many CRM strategies have stumbled because of difficulties in developing a strong understanding of who customers are and what they really want, according to practitioners and consultants who spoke at a CRM conference held here last week by The Conference Board Inc., a New York-based nonprofit association of business executives.

Companies may build multiterabyte data warehouses to crunch information about their customers and try to determine their buying habits or product preferences. But the results aren't always meaningful, conference attendees warned.

"People who bought Madonna [CDs] also bought lawn mowers — who cares?" said Jack Aaronson, director of personalization at New York-based online bookseller Barnesandnoble.com Inc. "Just because there's a correlation, that doesn't mean it's important."

The potential effects of missteps can be costly. In a new survey of 1,600 U.S. adults that was detailed at the conference by Impiric, a New York-based marketing consultancy owned by Young & Rubicam Inc., 66% of the respondents said they have troubled relationships or no relationship at all with at least some of 42 major companies in industries such as airline travel, retail and consumer packaged goods.

A Time for Change

Some companies are achieving measurable business results through CRM initiatives. But that can involve tweaking — or, in some cases, even obliterating — firms' historical approaches to dealing with customers or selling products and services, said attendees at last week's conference.

For example, customers of Charles Schwab & Co. were stepping up their demands for investment advice services to go along with the company's low-cost stock-trading capabilities. But that flew in the face of Schwab's internal culture: Until last year, "it used to be almost heresy to use the word *advice* around here," said Janice Rudenauer Shaler, vice president of electronic brokerage operations at the San Francisco-based discount broker.

In fact, call center representatives at Schwab used to be penalized for giving any advice to traders, Shaler added. But she said the company worked through those problems by having co-CEOs Charles Schwab and David Pottruck "evangelize" the importance of providing advice to customers. That message was further strengthened by last month's announcement that Schwab plans to acquire New York-based U.S. Trust Corp. and expand its investment advice services.

Even an Old Economy company such as General Motors Corp. has been able to change its ways.

Historically, GM's dealers have been separated from one another across the automaker's different product divisions. The problem with that setup is that there has been very little cross-selling among the divisions, said Chuck Kirk, general manager of enterprise customer management at Detroit-based GM and a former CIO at Chicago-based Fruit of the Loom Ltd.

To help remedy the situation, GM recently launched cross-divisional shopping capabilities for a group of 250,000 customers who were using the company's Web site to get information about new vehicles.

The move gave the customers access to information about models of GM cars other than the ones they initially inquired about, Kirk said, and the company's purchase rates have increased by 8% since the initiative was launched.

Not that it was easy. "We had islands of information between divisions," Kirk said. Content had to be presented so customers on one division's Web site could look at product information from another division, he said.

Getting GM's Web designers to go along is a process that "isn't completely there yet," Kirk said. "But we're getting there."

Web Site Pointers

- **Talk openly with customers.** They will tell you what they like and when your organization has gone too far with changes to products or services.
- Make sure the most important parts of your Web site are **geared toward one-to-one relationships.**
- Most people don't like to be blindfolded. **Don't restrict their view** of your Web site.
- Don't imitate your competitors. **Keep your distinctiveness.**
- Customers view all of your organization's touchpoints as one. **Unify** them or risk losing your customers.
- People like regularity. **Don't make frequent or dramatic changes** to your Web site unless needed.

SOURCE: JACK AARONSON, BARNES&NOBLE.COM, NEW YORK

Oracle Users Slowly Easing Toward 11i Suite

Some waiting until software more stable, easier to implement

BY MARC L. SONGINI
NEW ORLEANS

Many of Oracle Corp.'s users are eager to upgrade to its new 11i software, which promises a fully integrated suite of Web-enabled enterprise resource planning (ERP) and customer relationship management (CRM) applications. But at the Oracle AppsWorld conference here last week, some said they plan to take their time before making the switch.

Despite assurances from Oracle, conference attendees cited ongoing concerns about technical glitches in the software, as well as other issues, such as the internal business process changes that would accompany an upgrade.

"My sense in talking to various users is that they want to [upgrade to 11i] as soon as they can, but with caution," said Rocky Bertz, a project manager at Greenwood Village, Colo.-based CH2M Hill Cos. and treasurer of the Oracle Applications Users Group.

Bertz said his firm, which provides manufacturing and technology project management services, doesn't plan to go live with 11i until next year.

Oracle executives, however, said the latest versions of 11i are stable and that implementing the new suite is becoming easier. In fact, an updated 11i release became available just last week, and for users who don't need to customize the applications, upgrading is relatively simple, said Mark Jarvis, chief marketing officer at Oracle.

Conflicting Reports

At its first-ever U.S. AppsWorld conference, Oracle announced that since 11i was released eight months ago, 180 users, including London-based Barclays Bank PLC, Compaq Computer Corp. and Englewood, Colo.-based Agilera.com Inc., have gone live with it.

Cindy Pence, director of material and logistics at Tropian Inc., a Cupertino, Calif.-based manufacturer of radio circuit components, is among the Oracle customers who have gone live with 11i. Within a 90-day period, Tropian implemented Oracle financial, procurement, inventory and self-service modules, she said. The software will cost less than $100,000, and the implementation costs will be less than $200,000, she added.

In her 15 years in the field, Pence said, it was the easiest implementation she has ever done. More modules that handle order entry and tracking are slated to go live within the next year.

"Sure, there were some bugs, but no showstoppers," she said. "We had decided that we would rather take the risk of working through any potential bugs in 11i vs. having to deal with a future upgrade to gain that [desired] functionality."

Some users, however, are being cautious by either testing or slowly phasing in the software one piece at a time.

"Unfortunately, the early releases of the 11i software indeed had too many [technical] issues that are still being resolved," said Joel Flemming, global program leader at Honeywell Sensing and Control in Freeport, Ill. But Oracle has been quick to help Honeywell address the glitches that it has found, he noted.

The Honeywell Inc. subsidiary has been upgrading its procurement and financial software and other application modules from Oracle's 10.7 suite to 11i, Flemming said.

Woodcliff Lake, N.J.-based Ingersoll-Rand Co. is moving to completely standardize on 11i throughout its far-flung manufacturing operations. The company is already running 11i modules in some of its businesses, said Steven Wright, a member of an IT implementation team at Ingersoll-Rand, but it will add new installations only gradually, allowing time for the technology to mature.

Wright said he expects Ingersoll-Rand's Oracle ERP and CRM initiative to take five to seven years.

AT A GLANCE

E-Business Suite 11i

- Was released eight months ago
- Includes a full set of Web-enabled ERP and CRM business applications
- Has 180 users
- Has 2,500 ongoing implementations
- Includes new code (45% of the software)

Server Market Eyed in Microsoft Legal Case

Appeals court to hear arguments this week

BY PATRICK THIBODEAU
WASHINGTON

MICROSOFT CORP. and U.S. government attorneys will lock horns again this week, this time to focus on the future of the company and whether a breakup of Microsoft — splitting its operating systems from its applications business — will protect competition in other markets in which the company competes.

The two sides will appear in the U.S. District Court of Appeals to argue over the merits of a lower court ruling last year that found the company in violation of antitrust law and ordered its breakup.

Critics of Microsoft, such as the Computer & Communications Industry Association (CCIA), a Washington-based trade group whose members include Sun Microsystems Inc. and Oracle Corp., voiced concern about the future.

Ed Black, president of the CCIA, contended that Microsoft is "poised to capture the central nervous system" of corporate America — the server market.

According to preliminary IDC data released by the CCIA, Microsoft's share of the server operating systems market by shipments grew from 38% to 41% last year.

With the exception of Linux, which grew from 24% to 27%, market share declined for other server systems, including Unix.

Microsoft dominates the desktop and is "using that strength to influence people to use Microsoft software on the server, and that tactic is working extremely well," said Dan Kusnetzky, an analyst at IDC in Framingham, Mass. He also predicted that Microsoft will continue to increase its share of the server market.

But citing competition from Sun and the Linux operating system, Microsoft spokesman Jim Cullinan claimed that the fear of the company dominating this market is groundless. "We're competing with a lot of other very significant competitors," he said.

Others Not as Worried

Microsoft may be gaining ground in the server market, but the company isn't making enough progress to worry Keith N. Grossich, executive director of corporate IT at the Blue Cross and Blue Shield Association in Chicago.

Grossich said he believes competition will survive in the server space.

"In no way, shape or form do I see Microsoft monopolizing the business space," he said. "They are playing catch-up in a lot of regards on some of this stuff."

But Jack Spiegel, information systems manager at Cox & Co., an engineering and manufacturing firm in New York, said the ability of server companies to survive against Microsoft is becoming a factor in his IT purchasing.

Spiegel said he's concerned about the long-term survival of some server makers. He may decide to buy a server product from Microsoft "because I feel Microsoft is the stronger company and five years from now, Microsoft will probably still be there," Spiegel said.

While the government wants a remedy that will protect future markets, it will have difficulty in court next week discussing the impact Microsoft is having on server operating systems.

The judges will consider only the facts raised at the trial, said antitrust expert Hillard Sterling, an attorney at Gordon & Glickson LLC in Chicago. "Unfortunately for the government, this case has a closed record," he said.

Government Headaches

Seven judges are expected to hear Microsoft's appeal. The government faces the following problems:

TYING APPLICATIONS: Trial Judge Thomas Penfield Jackson ruled that Microsoft illegally tied its browser to its operating system. But a 1998 order by two appeals court judges found benefits to integrating the browser with the operating system.

REMEDY: Jackson didn't hold a hearing on his breakup order. Microsoft says the judge acted carelessly.

OUT-OF-COURT CONDUCT: Jackson's comments about Microsoft, in which he reportedly compared company executives to drug dealers, among other things, may help the company.

Network Outage Hits AT&T's ATM Users

Company says network switches down only briefly

BY JAMES COPE

About 5% of AT&T Corp.'s asynchronous transfer mode (ATM) network users were affected by an intermittent problem with the telecommunications company's ATM network switches last week.

The incident occurred between 1:30 and 5:30 p.m. on Feb. 20, according to AT&T spokesman Dave Johnson. He said that all but four of the ATM switches affected had been restored by 4 p.m. that same day and added that only one switch was still having problems by 4:30 p.m.

The ATM system was operating normally by 5:30 p.m., Johnson said. Citing "competitive reasons," he declined to disclose the total number of ATM switches that were down.

Dale McHenry, AT&T's vice president of data services, said in an interview Feb. 22 that AT&T was conducting a root-cause analysis to pinpoint the origin of the problem.

One likely trigger event, according to McHenry, was a problem on a trunk leading to one of AT&T's large ATM switches. "That trunk went up and down several times," he said, noting that such an event could trigger similar behavior in other ATM switches.

McHenry said technicians were able to stop propagation of the problem from one switch to another within 60 to 90 minutes.

Net Traffic the Culprit?

Jeff Moore, an analyst at Current Analysis Inc. in Sterling, Va., said most network switch problems occur during software changes. He said AT&T's last major outage involved its frame-relay network, which went down for 26 hours in April 1998 during a software upgrade.

But McHenry stressed that it was neither a software nor a hardware problem in this case and said the likely culprit was an aberration in network traffic. He said his team plans to re-create the problem in AT&T's lab to determine how to avoid it in the future.

The ATM switches on the network were made by Murray Hill, N.J.-based Lucent Technologies Inc., McHenry said.

Although AT&T's frame-relay system wasn't directly involved in the recent ATM outage, many of AT&T's permanent virtual circuits over frame relay are aggregated into ATM switches, according to Lisa Pierce, an analyst at Giga Information Group Inc. in Cambridge, Mass.

McHenry acknowledged that the ATM problems may have affected some frame-relay services, but he didn't elaborate.

Hole Found in Sun's Java

BY JAIKUMAR VIJAYAN

A vulnerability in certain components of Sun Microsystems Inc.'s Java software could allow an attacker to execute malicious commands on a victim's computer, the company revealed last week.

But the circumstances necessary to exploit this hole are "relatively rare," the company claimed in an advisory that was posted in the archive of Bugtraq at *www.securityfocus.com*.

The problem appears in various releases of Sun's Java Runtime Environment for the Linux, Windows and Solaris operating systems.

Versions 1.2.2_005 and Versions 1.2.1_003 and earlier of Sun's Java Development Kit and Runtime Environment are affected, according to a Sun spokesman.

Exploiting Changed Settings

The hole permits "the execution of commands from outside of the Java environment," the spokesman said. Typically, the permission needed to run such commands isn't given by default in Java. So for the hole to be exploited, a user needs to have first changed the default setting and given permission for an outside command to be executed, the spokesman said.

"The default setting is to not execute anything without permission," he added. In order to exploit the hole, a cracker would first need to know where such default settings have been changed, the spokesman said.

Ryan Russell, an analyst at SecurityFocus.com in San Mateo, Calif., said that the problem "does not appear to be a huge one," based on available information. "But you really need to have more details than what Sun has made available so far to know exactly what circumstances are needed for this to occur," he added.

Sun also said that Netscape Navigator and Microsoft Corp.'s Internet Explorer aren't exposed to this vulnerability.

Sun advised users to upgrade to a newer release of the Java Runtime Environment and the Java Developer Kit.

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BRIEFS

Eurowide Phone Hack Causes Damages

Hackers have succeeded in breaking into the telephone systems of various companies throughout Europe and have made calls on the companies' accounts. Total damage is estimated by insiders to be about $66 million, and the amount is still rising. In Austria alone, more than 100 companies, organizations and government institutions have reportedly been hit. Most systems involved are Meridian 1 systems manufactured by Nortel Networks Corp. in Brampton, Ontario, and supplied and serviced by Kapsch AG in Vienna. In one case, telecommunications equipment from LM Ericsson Telephone Co. was involved. Ericsson has confirmed the incident. The hackers reportedly gained access to the telephone systems by breaking into a Global System for Mobile Communications gateway.

Intel Settles Suit With Taiwanese PC Maker

Intel Corp. last week said it has settled its pending patent infringement lawsuit with First International Computer Inc., a Taiwanese manufacturer of motherboards and PC systems. Terms of the settlement were kept confidential but involve a licensing agreement between the companies that will cover certain patents, the firms said in a brief statement. The four patents cover areas including video graphics, power management and the ability to update the BIOS software of PCs.

Webvan Packs Up Dallas Operations

Webvan Group Inc. last week ceased operations in Dallas, where it employed 220 workers, "to . . . focus on the profitability of its nine other markets," according to a statement issued by the Foster City, Calif.-based online grocer. CEO George Shaheen said Dallas was its "least developed and most competitive market." Webvan entered the Dallas market through its acquisition of HomeGrocer.com in September. Last month, Webvan announced that it expects to have sufficient capital to fund operations through the year.

Chicago Pursues Metro Network Plan

CivicNet project takes shape as officials review response from networking vendors

BY JAMES COPE

THE PLANNED metropolitan area network called CivicNet that the city of Chicago is touting as the infrastructure of the 21st century appears to be shaping up as a viable project. City officials said last week that they have nearly finished reviewing responses to requests for information (RFI) that went out to networking vendors and equipment providers in December [Page One, Dec. 4].

CivicNet project director Doug Power said he was impressed with the 63 formal responses the city received from vendors. "They prove the business case of what the city wants to do," Power said, noting that Chicago wants the private sector to create and manage the network. In return, the city would be the anchor tenant for the network and pay CivicNet as much as $30 million annually in fees. That's the amount it currently spends on telecommunications services.

Bringing in Broadband

CivicNet is a 10-year project calling for the development of a fiber-optic infrastructure aimed at bringing broadband internetworking to the city's government offices, schools and businesses — and eventually to residences as well. The idea was generated by Chicago Mayor Richard Daley's Council of Technology Advisors, which is made up of representatives from local government, businesses and academia.

Service provider companies like Ameritech Corp., the regional Bell company that serves the Chicago area, and AT&T Corp. are enthusiastic about the CivicNet concept, Power said. "They talked [in RFI responses] about their existing optical backbones and how they could build on that existing infrastructure," he said.

Optical fiber companies that service large carriers, including Metromedia Fiber Network Inc. in White Plains, N.Y., and GiantLoop Network Inc. in Waltham, Mass., have expressed interest in the project, Power said. CityNet Telecommunications Inc. in Silver Spring, Md., which already has contracts to create fiber-optic rings in Albuquerque, N.M.; Omaha; and Indianapolis, also responded to the RFI, said Power.

The major network equipment providers, including Lucent Technologies Inc. in Murray Hill, N.J.; Nortel Networks Corp. in Brampton, Ontario; Cisco Systems Inc. in San Jose; and Alcatel in Paris, all submitted extensive responses to the RFI, Power added.

PHOTOISC

CHICAGO'S CIVICNET PROJECT aims to develop an optical-fiber infrastructure for bringing broadband internetworking to city offices, schools, businesses and, eventually, residences over a 10-year period.

Power said he was pleased that those companies, as well as Tulsa, Okla.-based Williams Communications Group Inc.; WorldCom Inc.; and Blue Bell, Pa.-based Unisys Corp. all advocated forming multivendor partnerships for the project. He said partnering among vendors was one of the outcomes the project team hoped to achieve by listing RFIs, vendor contacts and phone numbers on a dedicated Web site located at *www.chicagocivicnet.net*

Next Step: RFPs

Joe Mambretti, director of Internet research at Northwestern University in Evanston, Ill., also reviewed responses to CivicNet RFIs and said the vendors did a first-rate job of providing technical input, especially on network architecture. "There are places in this project for many types of people, including secondary providers who might be doing messaging or video services," he said.

The next step is to prepare the request for proposals, Power said.

"We're shooting to get it out in late April, and we'll develop a short list [of vendors] from those responses," he said.

The city of Chicago expects to award contracts for the project sometime later this year, Power said. ◗

Robot Lays Fiber-Optic Net in Albuquerque

Broadband access key for businesses, service providers

BY JAMES COPE

In the sewers below the streets of Albuquerque, N.M., last week, a remote-controlled robot began pulling conduits from building to building, creating a pathway for a fiber-optic network that will provide broadband access to businesses.

The network is being built by CityNet Telecommunications, which has been tapped to build similar networks in Indianapolis and Omaha. A CityNet spokesman said the robot began pulling conduits Feb. 18, and the first ring of optical fiber should be in place by April.

According to Steve Merrill, CityNet's senior vice president of engineering and operations, his company will lease the optical fiber to Internet service and telecommunications providers. They, in turn, can use it to provide internetwork services to businesses.

Merrill said CityNet will share revenue with the city of Albuquerque and will maintain the installation, including regular cleaning of the sewer lines where the network is installed.

Albuquerque Mayor Jim Baca said he's enthusiastic about the prospect of an optical network connecting buildings throughout his city. "A high-growth city like ours needs broadband communications as much as our forefathers needed the railroads," he said. ◗

A ROBOT from CityNet Telecommunications installs conduits for Albuquerque's fiber-optic network.

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Pricing Glitch Yields Brief Bargains at Staples

Web site typo results in $39.98 loss per item

BY LINDA ROSENCRANCE

A PRICING GLITCH on Staples.com over the President's Day weekend allowed an unknown number of lucky bargain hunters to get more than they bargained for — $40 attaché cases that were being sold for just one penny apiece.

At that price, some shoppers bought 50 or more cases — some to sell for profit on eBay, others to give as gifts.

Tom Nutile, a spokesman for Framingham, Mass.-based Staples.com, confirmed the pricing mistake and blamed human error.

"Because of a typographical error on Staples.com, a number of customers received an attaché case for a penny that [was] supposed to sell for $39.99," Nutile said. "We posted the incorrect price late Saturday [Feb. 17] and discovered it on Sunday.

"A number of orders went through and were delivered," he said. "But we stopped a number of orders and alerted those customers by e-mail that we wouldn't deliver their order and they wouldn't be charged for them."

He declined to say how many attaché cases were sold at a penny apiece or how much the mistake would cost the company.

Bargain Spreads Fast

Word of the glitch spread like wildfire on Web sites such as FatWallet.com, a Monroe, Wis.-based site that alerts consumers to discounts at various online stores and provides a forum for consumers to share information.

Buyers bragged online about their good fortune; some said they didn't even have to pay for shipping, and others noted that cases had been put up for sale on eBay Inc.'s auction site.

"I just got my order of 15, total was $8.11 including shipping and handling and tax," one unidentified shopper wrote online. "That makes each bag 54 cents. The bags are essentially junk, but for 54 cents you can't complain."

David Cooperstein, an analyst at Forrester Research Inc. in Cambridge, Mass., said Staples.com wasn't legally obligated to honor an incorrect price.

"It would be more of a moral obligation, not a legal one," he said. "And the fact that they don't honor the prices creates a lot of bad publicity."

Staples.com should have systems in place to correct such errors before consumers see them, said Cooperstein.

"Incorrect prices are common occurrences ... because companies don't have content management systems in place to catch any errors before they're posted," he said.

Staples.com isn't alone. United Air Lines Inc. in Chicago said last week that it would honor dirt-cheap international fares — $24.98 from San Francisco to Paris — incorrectly posted on its Web site last month. The reason: It wanted to keep customers happy. ◗

Online Oopsies

Recent pricing mistakes and how companies responded:

FEBRUARY

- A typo lets shoppers purchase a $39.99 attaché case for 1 cent at Staples.com; the retailer cancels orders as soon as it discovers the error.

JANUARY

- A computer glitch at the United Air Lines Web site lets travelers purchase cheap tickets for international flights – for example, $24.98 from San Francisco to Paris; the airline ultimately decides to honor the low fares.
- A computer glitch lets people use unauthorized coupons at Macys.com; the company refuses to honor the coupons.

H-1B Hiring Steady Despite Cap Increase

But recruiters say firms more flexible

BY JULEKHA DASH

Last year, companies convinced Congress to raise the quota for foreign workers with technology skills who can enter the U.S. But this year, some employers are approaching the H-1B issue with less urgency.

In October, Congress raised from 115,000 to 195,000 the number of visas allotted to foreign workers, many of whom possess specialized technology skills. But because overall hiring is slowing, some employers may not need the extra visas.

According to Sarah Pierce, a legislative aide at the Society of Human Resource Management in Alexandria, Va., when the visa restriction was raised, employers "breathed a sigh of relief" because their pool of candidates had been increased. But the economy made it unnecessary for them to "step up their hiring practices," she said.

Immigration and Naturalization Service (INS) officials said they won't know how many H-1B visas companies have used until a few weeks from now. But INS spokeswoman Eyleen Schmidt said they're "nowhere near" the cap.

This stands in sharp contrast to last year when employers — mostly high-tech firms — raced to hire H-1B visa holders before the 115,000 visas were exhausted March 21.

The economic downturn has also altered some employers' hiring plans.

Last year, Gobosh in San Jose had to look "outside the domestic labor pool" to increase its staff by 30%, said Maggie Yunker, human resources manager at the technology consultancy. As a result, H-1B holders accounted for 15% of the firm's new hires.

"It used to be that if you were looking for workers with over four years of experience, there were not many résumés," said Yunker. But this year, she says, she can find plenty of experienced U.S. workers, even those with specialized technical skills.

Dallas-based Texas Instruments Inc. expects its hiring of H-1Bs to remain steady because it "doesn't have as many openings this year," said recruiting manager Roger Coker. Last year, recruiters filled almost 4,000 job openings, he said.

A TI spokesman said the company hired 97 H-1B workers, mostly electrical engineers, during its last fiscal year and 166 the year before.

But Coker said the cap increase has let the company be more flexible in its hiring practices. Once the cap was exhausted last year, he said, TI knew it would lose top international workers to companies overseas, because the U.S. government limits foreign visas.

"This limited our ability to be competitive," said Coker. But this year, "when one of our recruiters finds an outstanding candidate, we can probably hire that" worker, he said.

But Alisa Bright, a human resources officer at SAS Institute Inc. in Cary, N.C., said her company expects to increase H-1B hiring slightly this year, although she couldn't cite exact figures. ◗

Who's Hiring?

Top H-1B employers, October 1999 to February 2000:

COMPANY	NUMBER
Motorola Inc.	618
Oracle Corp.	455
Cisco Systems Inc.	398
Mastech Corp.	389
Intel Corp.	367
Microsoft Corp.	362

SOURCE: IMMIGRATION AND NATURALIZATION SERVICE

Sun Gets Into Peer-to-Peer Development

BY LEE COPELAND GLADWIN

Sun Microsystems Inc. is developing a Web-based software platform, called JXTA, which developers could use to write distributed peer-to-peer applications.

Bill Joy, chief scientist at Sun, announced the new development project at the O'Reilly Peer-to-Peer Conference in San Francisco earlier this month. Sun has been working for the past six months on JXTA (for Juxtapose), an open-source software project that will provide a basic infrastructure for building peer-to-peer applications.

Sun plans to make the software available as open-source code using hosted development services from Collab.Net Inc. in San Francisco. But Sun would offer few additional details on the JXTA project, which it expects to officially unveil in April.

More Bandwidth

Frank Bernhard, an analyst at Omni Consulting Group LLP in Davis, Calif., said interest in P2P-style applications has grown because of their ability to better utilize bandwidth.

"The companies using peer-to-peer types of networking applications are those trying to circumvent buying more bandwidth and trying to be conservative in building big [networks]," said Bernhard.

But he voiced doubts about Sun's P2P infrastructure initiative. "It's a first try and a gumshoe attempt to put together pieces of a peer-to-peer strategy," Bernhard said. "It will take several iterations and revs of code to get it to maturity."

Intel Corp. also unveiled a framework for developing secure P2P applications this month. The Santa Clara, Calif.-based microprocessor vendor made available an open-source library that supports digital certificates and signatures, secure storage, public-key encryption and symmetric-key encryption. ◗

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BRIEFS

EMC Reduces 2001 Growth Projections

After analysts at two financial firms recently predicted that a slowdown in IT spending would affect data storage equipment sales, market leader EMC Corp. last week lowered its growth forecasts for this year. Traditionally unscathed by economic downturns, EMC now expects revenue growth to be in the range of 25% to 35% for 2001, a decrease from its forecast last month of 33% to 37%. The decrease in growth is due mostly to a drop-off in sales to dot-coms. A spokesman said those sales, which made up 6% to 7% of the company's revenue during the second half of last year, have dropped to zero.

GM, Autobytel to Test Online Car Sales

General Motors Corp. in Detroit and online car buying site Autobytel.com Inc. in Santa Clara, Calif., last week said they're teaming up to run a 90-day test of a new service aimed at enabling car shoppers to buy vehicles from specific dealers via the Web. The agreement follows GM's disclosure earlier this month that it was seeking an online venue that would let people shop for multiple makes and models of cars. At that time, GM said it would either buy an existing site or launch one of its own.

Short Takes

German telecommunications equipment maker SIEMENS AG will acquire Dallas-based EFFICIENT NETWORKS INC., a maker of Digital Subscriber Line devices, for about $1.5 billion. . . . PEAPOD INC., the financially troubled online grocery delivery service, reported worsening financial results for the fourth quarter. The Chicago-based company said sales increased 11% to $23.7 million over the same period in 1999, but losses increased from $9.1 million to $23.8 million. . . . INITIATIVES THREE INC., a Portland, Ore.-based call center consulting firm, has launched Agent Initiatives, a Web community for call center representatives. The site will provide resources to call center representatives in areas such as managing stress and improving customer interaction.

PGP Inventor Resigns From Network Associates

Cites disagreement over public source code

BY DAN VERTON

PHILIP ZIMMERMANN, the inventor of the widely used Pretty Good Privacy (PGP) encryption protocol, last week said he had left the company that owns the protocol because he and the company no longer agree about how much source code should be released to the public.

The world-renowned cryptographer in 1996 founded Pretty Good Privacy Inc. based on the PGP freeware encryption algorithm he invented. Santa Clara, Calif.-based Network Associates Inc. acquired the company in 1997.

The company, now called PGP Security, has continued to release open versions of PGP source code but has also built enterprise applications based on the code. Zimmermann contended that the firm intends to release less source code than it has in the past.

"New senior management [at Network Associates] assumed control of PGP Security in the final months of 2000 and decided to reduce how much PGP source code they would publish," Zimmermann wrote in a letter to PGP users. He told *Computerworld* that he thinks Network Associates will still publish some source code, but he doesn't know how much.

Zimmermann will take the post of chief cryptographer at Dublin-based Hush Communications Inc. and will spearhead other security efforts.

Business as Usual?

Sandra England, president of PGP Security, said that nothing has changed. The company is committed to publishing the encryption algorithms and all portions of the source code related to encryption, she said.

"What we are not publishing is source code that has no value in the encryption world," she said, such as the graphical user interface, management features, personal firewall code and intrusion-detection system code related to Network Associates products. To do that would be the equivalent of "turning over the crown jewels of our product line," said England.

ZIMMERMANN will be chief cryptographer at Hush.

Network Associates CEO George Samenuk dismissed the departure. "Phil Zimmermann left Network Associates as an employee two years ago and has been on contract with us ever since. We simply decided not to renew that contract," he said.

This June marks the 10-year anniversary of the release of PGP to the public. PGP was originally designed to protect privacy and civil liberties, and the process hasn't always been smooth. Corporate control and the issue of "back doors" — code inserted surreptitiously allow let third parties to read encrypted e-mail — have been the subject of many heated battles among users, software engineers and vendors.

Zimmermann last week assured PGP users that all versions of the protocol that he has worked on, including the current release, PGP 7.0.3, are free of back doors.

England said, "You have my word that there will never be a back door in PGP."

John Pescatore, a security analyst at Gartner Group Inc. in Stamford, Conn., downplayed the role that PGP has played in information security since Network Associates bought the company.

"Network Associates really drained the life out of the PGP brand, trying to straddle the fence between PGP's open-source roots and the desire to sell enterprise software to large companies," he said.

Laura Rohde of the IDG News Service contributed to this story.

Continued from page 1

Power

But Y2k had one advantage over this crisis: predictability.

"It's not like Y2k, where you knew that it was coming," said Mel Reeves, CIO at ARB Inc., an international maker of oil pipelines in Lake Forest, Calif. One of ARB's sites in Pittsburg, Calif., lost power for 65 minutes last month. That unplanned outage caused damage to computer systems, compromised security and resulted in the loss of a day's worth of transaction data, Reeves said.

"Every time our system crashes, it corrupts a lot of data files, and we have to go to tapes of the day prior, and everything done that day could be lost," said Reeves.

In response to the continuing threat of blackouts, Reeves recently installed an additional uninterruptible power supply (UPS) — a backup battery system that supplies power for about one hour — and two backup generators. The new system, which cost $40,000, also notifies Reeves of a power loss so that IT staff can get to the site to properly shut down computer systems before the alternate power runs out.

Raytheon Co. in Lexington, Mass., has asked its West Coast sites for contingency plans for an "orderly" shutdown of computer systems in response to a 15-minute advanced warning of a power outage, said Paul Christidis, a senior staff engineer at the $17 billion aerospace and defense giant.

"We know how to handle the situation because of the Y2k projects that we convinced management to invest in last year," Christidis said.

"The upside to Y2k preparedness is that many companies already have disaster scenarios in place," said Joel Yaffe, an analyst at Giga Information Group Inc. in Cambridge, Mass.

"We leveraged the concerns about Y2k to get a diesel generator system, but rolling blackouts weren't a concern back then," said John Burke, computer systems manager at Pacific Coast Building Products Inc. in Sacramento, Calif. The 600-amp generator automatically kicks in after 30 seconds of power loss, but Burke said it's not a "low-cost solution."

PHOTODISC

CALIFORNIA FIRMS OUTSIDE of the protected power grids are at risk.

Some corporations, including Charles Schwab Corp. in San Francisco and Egghead.com Inc. in Menlo Park, Calif., said they haven't been affected because they're in protected power grids in financial districts or near fire stations. But firms outside of those protected areas haven't been so lucky.

After suffering through a blackout, Amsterdam Art Inc., a chain of art supply stores in Berkeley, Calif., bought a portable gas generator to keep its warehouse and stores' computing environment running during future power outages, said Lewis Moore, vice president of administration. Moore said he didn't want the firm's point-of-sale server to crash and lose customer spending and analytics data.

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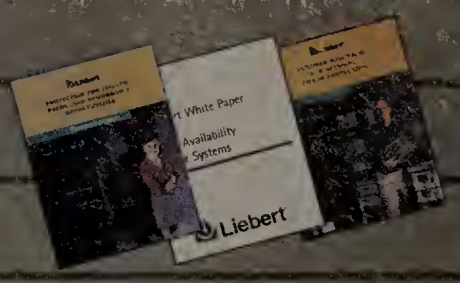

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Worm Highlights Threat Posed by Virus Tool Kits

But basic precautions should keep corporations safe, users and analysts say

BY JAIKUMAR VIJAYAN

THE READY availability of virus-generating tool kits will continue to make it relatively easy for even amateur crackers to write worms such as the recent Anna Kournikova virus, analysts and users warned.

But since many of these kits rely on previously used methods for creating and propagating viruses, damage can be minimized if corporations take basic precautions, they said.

The Anna worm was allegedly created by a 20-year-old Dutchman who calls himself "OnTheFly." He turned himself in soon after to police in the Netherlands. Analysts believe he used an easily available virus-generation tool kit called the VBS Worm Generator to write the worm. Such kits, written by hackers, are usually available for free download over the Internet.

Though that particular kit has since been pulled from the Internet by its Buenos Aires-based developer, analysts said there are literally scores of similar ones that can be used by would-be crackers to easily write similar worms.

The kits go by names such as Instant Virus Production Kit, Satanic Brain Virus Tools, The Trojan Horse Construction Kit and The Virus Factory.

Many come with easy-to-use interfaces and pop-up help files that walk would-be crackers through the process of creating a virus — from choosing a name for it through choosing a way to spread it.

Some tool kits, including the one used to create the Anna worm, let users choose from a variety of payloads that range from self-replication to attempting to crash networks.

"It's all very menu-driven and easy to use. . . . It is just a question of a click here and a click there," said Roger Thompson, an analyst at Reston, Va., security firm TruSecure Corp.

"The guy who launched the Anna virus didn't even have to change many of the default options [to get the worm to work]," he said.

"You are talking about giving something that can create a lot of damage to just about anyone in the world with access to the Internet," said Ira Winkler, president of the Internet Security Advisors Group.

What make some virus-generation kits particularly dangerous is that they allow even amateur crackers to add variations that can sometimes help them slip through antivirus defenses, Winkler added.

The Anna virus, for instance, was able to break through many antivirus barriers because it used an encryption feature available in the tool kit, analysts said.

Yet despite the ease with which the Anna virus spread, most worms generated by tool kits use well-understood and predictable ways of creating and propagating a virus, said Josh Turiel, MIS manager at Holyoke Mutual Insurance Co. in Salem, Mass. This makes worms relatively easy to detect and block using antivirus tools and generic filtering approaches, he said.

"Back around 1997, somebody generated 15,000 viruses from a single kit — all of which were detected by just about every single virus vendor," said Thompson.

In addition to antivirus technologies, Holyoke Mutual simply blocks all e-mails with Visual Basic Script (VBS) attachments from its network. "We had 30 copies of the Anna virus bounce off our network in about three hours," Turiel said.

"The organizations that are going to continue getting nailed by such attacks are those that still don't have any central control over their e-mail, and small companies with no security [infrastructures]," he added.

JUST THE FACTS

Epidemic

According to a recent IDC survey of 1,000 corporations:

- **Viruses are the most common form of security problem for corporations.**
- **90% of the respondents said they had been hit by a virus.**
- **Antivirus software is the most commonly used security technology.**

Continued from Page 1

FBI

cause of the degree of access insiders have."

Friedberg is now a computer crime consultant at Stroz Associates LLC in New York. During the past six months, the firm has worked with half a dozen companies that have been victimized by insiders, said Friedberg. Those cases involved everything from deleted files to cases where individuals covertly set up competing businesses on their employers' servers, he said.

Because Hanssen was an authorized user, his queries didn't raise any suspicion. However, after Hanssen was arrested while allegedly dropping off classified paper documents for his Russian handlers, the FBI was able to correlate his log activity in the database with his espionage activities.

"In short, the trusted insider betrayed his trust without detection," FBI Director Louis Freeh said during a press conference.

Freeh has since ordered that a special panel be formed to review all FBI processes and systems and to study the issue of insider abuse.

According to a survey of 359 companies by the FBI and the Computer Security Institute in San Francisco, companies lost more than $50 million last year as a result of unauthorized insider access and abuse of IT systems. Some 38% of firms in the survey reported between one and five incidents of insider abuse. Another 37% said they didn't know how many breaches had taken place.

Hanssen was assigned to the New York Field Office's intelligence division in 1979 to help establish the FBI's automated counterintelligence database in that office. Investigators characterized Hanssen as having a "high degree of computer technology expertise."

Hanssen made extensive use of computer media, such as encrypted floppy disks, removable storage devices and a Palm II handheld computer, to communicate with Russian intelligence officers, according to the affidavit. He provided as many as 26 encrypted floppy disks during the course of his activities, it said. Hanssen used a technique called 40-track mode, in which a floppy disk is made to have slightly less capacity than normal, allowing text to be hidden in what appears to be a blank disk.

"Security is not mainly about software or biometrics. First and foremost, it's about people and policies," said Richard Hunter, a security analyst at Stamford, Conn.-based Gartner Group Inc.

One way companies can protect themselves from insider abuse is to focus on what their networks can tell them about what's going on inside the company, said Friedberg. He recommended that companies look into artificial intelligence-enabled software that can tip administrators off to anomalous activity on the network.

Allen Thomson, a former CIA scientist, suggested that maybe the FBI and companies should consider using the two-person integrity rule for all sensitive database searches and system operations as a means to reduce the chance that information will be deliberately compromised. That means two people would have to agree to the searches and both would bear witness to what was being done and why. The intelligence community routinely uses the two-person integrity rule for things such as handling cryptographic keys and other highly sensitive data.

"This would be a pain but might cut down on unauthorized/malicious use," Thomson said. The downside, however, is that this could frighten some users and cause them not to use the tools that are available to them, he said. So, "roaming around and looking for anomalies and patterns is [still] a good thing in many disciplines, counterintelligence among them."

DOUG MILLS ASSOCIATED PRESS

FBI AGENTS CONFISCATE computers belonging to Robert Philip Hanssen last Tuesday. Hanssen was arrested at a park in Virginia after he allegedly passed classified information to Russian intelligence agents.

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For a server operating system, the five nines are a measure of reliability that translates into just over five minutes of server downtime per year.* Of course, rumors of this 99.999% uptime usually start under ideal lab conditions. But where are these five nines when your company needs them? If you're using Microsoft® Windows® 2000 Server–based solutions, they may be closer than you think. Today Starbucks, FreeMarkets and MortgageRamp, an affiliate of GMAC Commercial Mortgage, are using Windows 2000 Server–based systems that are designed to deliver 99.999% server uptime. With system architecture improvements for higher server uptime plus fault-tolerant and redundant systems for increased availability, the Windows 2000 Server platform is helping these companies maximize

Microsoft Windows 2000 Server Family

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uptime and minimize network interruptions. But a server OS alone doesn't get you five nines, which is why we've teamed up with industry-leading system providers to ensure that the right combination of people, process and technology is utilized. Industry leaders such as Compaq, Hewlett-Packard, Unisys, Stratus and Motorola Computer Group can work with you to deliver solutions with up to five nines uptime with their custom-built Windows 2000 Servers shipping today. Of course, not all installations require this level of reliability, but one thing is for sure: The Windows 2000 Server family can help you get to the level of reliability you need, even five nines. To learn more about server solutions you can count on, visit **microsoft.com/windows2000/servers** **Software for the Agile Business.**

Microsoft

Storage Managers Get Certification Program

EMC program could lead to training standards for much-needed support staff

BY LUCAS MEARIAN

EMC CORP. recently launched a certification program for IT workers involved in managing storage devices, and analysts said the rollout could go a long way toward creating training standards in a part of the technology market that's sorely lacking in highly qualified support personnel.

The new certification program expands on an earlier set of training classes that were offered only to the Hopkinton, Mass.-based firm's own employees and some of its business partners.

While rivals such as Sunnyvale, Calif.-based Network Appliance Inc. and Compaq Computer Corp. have also recently announced storage-related certification programs, EMC's offering is significant because its training regimen is "very robust and equipment-neutral," said Cushing Anderson, an analyst at IDC in Framingham, Mass.

Anderson said EMC is trying to fulfill two basic goals with the new program: to improve the capabilities of IT technicians involved in implementing storage devices and to promote loyalty to its products. But beyond the obvious potential benefits for EMC, he added, the program could help set professional standards for storage networking equipment as a whole.

John Root, EMC's training manager, said certification is a key element that had been missing in the company's ability to measure whether technicians at customer sites could manage its storage systems. "We just weren't able to put our arms around who could do what," he said. The Proven Professional Certification Program is aimed at "building skills to support methods and operations, instead of [specific] products," Root added.

Web-based Training

The courses will include a combination of live Web-based training and instruction at 13 training facilities and 21 data centers in North America, Europe and Asia, said EMC.

The company said IT workers can opt to bypass the training classes and immediately take the certification tests, which are being administered by King of Prussia, Pa.-based ProMetrics Consulting Inc.

How receptive EMC's users will be to the training remains to be seen.

Mark Purdy, who manages the online ticker plant at Bloomberg LP in New York, said EMC certification would carry weight for job applicants, but he wouldn't consider sending his own seasoned IT staff to the classes.

Bloomberg.com uses EMC's Clariion storage arrays to handle its high volume of trading data.

Purdy said EMC's high-end storage arrays are difficult to manage because of a lack of graphical user interface prompts, so most of the training for the systems is customized and developed in-house at Bloomberg.com. "I think most of our people are beyond [the EMC training]," he said.

Dan Wills, vice president of operations at e-mail service provider USA.Net Inc. in Colorado Springs, had a similar response. Wills said EMC's certification is something many of his technicians will eventually strive to obtain, but he added that he wouldn't necessarily need to send them to any classes since they receive on-the-job training.

"It would be a good hit on a résumé, though," he said. ◗

MORE THIS ISSUE
For more on EMC, **see page 23.**

Storing Knowledge

The EMC Proven Professional program offers certification training in operator, builder and architect tracks.

- The first 25 hours of each course will be taught online. After completing the "e-training," students will be allowed to sign up for time in classrooms at **17 centers around the world.**
- Each course will take **two to four weeks** to complete.
- EMC predicts as many as **2,000 IT staffers from customers and partners** will undergo the training this year.

Managed Services Expand At Rapid Rate

Users now have help for off-hours

BY MARK HALL

Managed service providers (MSP) hit a market milestone, and several MSPs escalated their offerings last week as IT continues to use them to fill operational holes.

The MSP Association in Wakefield, Mass., said last week that it had signed its 100th member, up from only 19 when the industry group started eight months ago. Michael Coffield, the vendor association's president, said the business world's shift to an around-the-clock operational schedule has prompted IT managers to look for help from outsiders.

That was the case at GATX Capital Corp. in San Francisco. GATX, the financial services arm of a leasing company, last year signed Nuclio Corp. in Oakbrook Terrace, Ill., to manage its Notes e-mail operations during off-hours as its business shifted to serve more global customers.

"I got a night shift for a fraction of what it would cost," said Brian Comnes, director of technology services at GATX.

Comnes added that with Nuclio, he has seen his Notes downtime drop from 80 hours a year to four.

"In the leasing business, delays in communications can have expensive consequences," he said, noting that holding up a plane's lease for a single day costs GATX $10,000 in airport parking fees alone.

Yet with more than 100 companies offering MSP services, it can be "difficult for IT to choose the right service," said Corey Ferengul, an analyst at Meta Group Inc. in Stamford, Conn. He said this technology services market is young and mostly attractive to IT managers "comfortable with being early adopters."

"MSPs are destined to succeed because they are moving beyond monitoring Internet infrastructure and going all the way up to the desktop," said Lisa Perry, an analyst at Boston-based Aberdeen Group Inc.

SilverBack Technologies Inc. Vice President Skip MacAskill said his Billerica, Mass.-based MSP wants to move deeper into the enterprise. In that vein, SilverBack announced last week a series of new MSP services, including remote monitoring of Oracle database activities. It already offers Internet management programs.

Also last week, Nuclio introduced its Fusion Web Manager 2.0 with enhanced services. Those include customized views of a user's infrastructure as well as direct control of resources across the Web. ◗

HP Closes Middleware Gap With Netaction Suite

BY JAIKUMAR VIJAYAN

Hewlett-Packard Co. recently closed a glaring gap in its software product portfolio with the delivery of its HP Netaction middleware suite.

The software combines technologies from Bluestone Software Inc. — a recent HP acquisition — with existing HP software such as e-Speak service integration software and HP Process Manager.

The Netaction suite should give users a wide range of XML-based application and service integration capabilities that are needed for building e-commerce business-to-business environments, said Rajiv Gupta, a vice-president at HP.

Netaction's strong support for XML-based technologies means it can be used not just in HP environments but also in cross-platform environments, Gupta said.

"HP is hoping to get a running start in the whole application server space, where they have not had much of a presences until this," said Dwight Davis, an analyst at Summit Strategies Inc. in Boston.

"HP hasn't had a product that's been competitive with IBM's WebSphere or Sun's iPlanet" suite, he added.

The extensive support for XML built into Netaction could give users some added value, Davis said.

Earlier this month, HP enhanced its OpenView systems management technology with tweaks to its network and storage management capabilities as well as new hooks for managing Netaction. ◗

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Forms Maker Slashes $15M From IT Budget

BY TODD R. WEISS

As part of a corporatewide effort to revive itself financially, business forms vendor Moore Corp. last week announced that it will cut $15 million from its IT budget during the next 18 months.

The aim is to better track Moore's IT investment dollars. Company President and CEO Robert Burton, who took over in December, said in a statement that the IT cuts will be made in areas where "we have historically made investments without a clear understanding of how the technology was intended to support our core business."

The struggling Toronto-based company recently completed a review of the infrastructure across its seven divisions and will implement the IT reductions amid an overall $100 million corporate fat-trimming plan that Burton presented last month.

As part of the new strategy, Robert Sell, a former vice president and CIO at Brunswick Corp. in Lake Forest, Ill., has been hired as Moore's CIO. Sell replaces Robert Jones, who has left the company.

Moore spokesman Stephen Forbes said the IT spending cutback is being made because the new management team found that the company's seven divisions had worked separately for years without an overall IT plan. "Instead of the seven divisions working as one, they worked independently," Forbes said. "We weren't getting the optimum use from our systems."

'Bellwether of Sanity'

Joshua Greenbaum, an analyst at Enterprise Applications Consulting in Daly City, Calif., said Moore's strategy to cut back on IT spending and give itself time to see what it has to show for its investments thus far is a good idea. "I think that Moore may be a bellwether of sanity, in terms of IT," he said.

Greenbaum said he doesn't think a $15 million cut will be debilitating, since it probably isn't a huge slice of the overall IT budget. Moore declined to disclose the size of its total IT budget.

Many companies make IT systems purchases that don't actually improve their operations, and they later push them aside to make room for other initiatives, Greenbaum said. "The shelfware problem is bigger than anyone likes to admit," he said.

Two weeks ago, Moore announced that it would cut 400 jobs in its North American forms and labels operations division, saving another $20 million. All the changes, including Burton's appointment as CEO, follow a December agreement under which Moore received $70.5 million in debt financing from Chancery Lane/GSC Investors LP in New York, an investment firm that could eventually take a 19.7% stake in the company. Burton is an investor in Chancery Lane/GSC.

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BRIEFS

Intel Slows Hiring, Postpones Pay Raises

Intel Corp., combating a slowdown in chip demand, confirmed last week that it will institute measures to save hundreds of millions of dollars this year. The measures include deferring pay increases, restricting new hiring and reducing "discretionary spending," which includes travel and overtime, by 30%.

Microsoft Settles Unfair-Trade Lawsuit

After being ordered last year to pay almost $5 million in damages and costs to Bristol Technology Inc. in Danbury Conn., Microsoft Corp. last week announced that it has agreed to settle an unfair trade practices lawsuit filed against it three years ago by the software vendor. The settlement's terms weren't disclosed, but the companies said their claims against each other are being dismissed with prejudice, preventing the suit from being revived later.

Short Takes

NORTEL NETWORKS CORP. chief technology officer Bill Hawe has resigned from the Brampton, Ontario-based networking giant. The company didn't disclose the reason for his departure. . . . Speech and language technology provider LERNOUT & HAUSPIE SPEECH PRODUCTS NV in Ieper, Belgium, has received $60 million in financing as part of its bankruptcy proceedings. . . . COMPAQ COMPUTER CORP. and IBM, the leaders in server shipments in Latin America, lost market share there last year, according to a new study from San Jose-based DATAQUEST. . . . In an ongoing review of its accounting practices for last year, broadband services provider COVAD COMMUNICATIONS GROUP INC. in Santa Clara, Calif., said it may have to reduce its reported revenue by about $52 million and write off as much as $100 million in restructuring charges, or five times what it previously forecast. . . . Emeryville, Calif.-based SYBASE INC. has agreed to acquire Englewood, Colo.-based NEW ERA OF NETWORKS INC., which provides application integration software and services, in a stock-for-stock transaction valued at $373 million.

EMC Begins Targeting Multivendor SANs

In response to users, new software will support storage systems made by rivals

BY LUCAS MEARIAN

EMC CORP. last week announced storage-area network (SAN) software that's designed to manage storage devices made by some of its rivals and said it's adding mixed-vendor support in response to pressure from systems administrators.

Users have been pushing for the ability to manage EMC's Symmetrix and Clariion disk arrays along with other storage products and connectivity devices, according to officials at the Hopkinton, Mass.-based company.

To start with, disk storage systems made by Compaq Computer Corp., Hewlett-Packard Co. and Tokyo-based Hitachi Ltd. and tape devices from Louisville, Colo.-based Storage Technology Corp. have been certified to work with the new software.

The software can also control network switches and other connectivity devices made by companies such as Brocade Communications Systems Inc. in San Jose and McData Corp. in Broomfield, Colo., EMC said.

Single Point of Control

An addition to EMC's Enterprise Storage Network (ESN) product line, the new ESN Manager tool is meant to provide a single point of control for administrators to use in managing multiple "zones" of interconnected storage devices.

John Battel, Stack Computer Inc.'s executive vice president, said using EMC's ESN Manager has allowed him to join McData, EMC and Brocade switches to manage a storage network as one environment.

"It allows us to increase the amount of storage managed per customer," he said. "And clearly, it allows us to better manage it and more rapidly allocate it to projects where it's needed."

Costa Mesa, Calif.-based Stack designs enterprise storage infrastructures by first testing them in one of two data centers. With 12TB of data between the two data centers, Battel said, the software has delivered a good return on investment for his company.

Steve Duplessie, an analyst at Milford, Mass.-based research firm The Enterprise Storage Group Inc., said he never thought he'd see the day when EMC began "acknowledging other systems existed out there."

JOHN BATTEL used ESN Manager to join several switches.

But the company's rivals shouldn't take too much comfort from the move, he added.

The development of ESN Manager "should scare the hell out of [other vendors]," Duplessie said.

"EMC is already clearly the storage king. All of a sudden, if they actually live up to what they say and . . . become an open systems management provider, they are really a lethal weapon," he predicted.

EMC's announcement came a week after Sun Microsystems Inc. said it was teaming up with former rival Brocade.

Sun announced that it would start selling Brocade's Silkworm switches, which act as data traffic directors in a SAN. Brocade in turn said it would begin using Sun's Jiro SAN management software with its devices.

Linux Vendors Consolidating, Cutting Back

Some firms reacting to struggles of their dot-com user base

BY TODD R. WEISS

Consolidation and cutback moves by Linux vendors accelerated last week, highlighted by VA Linux Systems Inc.'s disclosure of increased losses, a 25% workforce reduction and key management changes.

The cutbacks at Fremont, Calif.-based VA Linux were followed a day later by an announcement that rival TurboLinux Inc. in Brisbane, Calif., has agreed to acquire Linuxcare Inc., a San Francisco-based company that offers Linux-related consulting services. Both TurboLinux and Linuxcare went through layoffs and management changes of their own last spring.

VA Linux reported a pro forma loss of $13.4 million for its second fiscal quarter ended Jan. 27, more than double the $6.3 million deficit in the same period a year ago.

As part of the financial results announcement, VA Linux said it's laying off about 140 of its approximately 560 workers. The company also named Ali Jenab its new president and chief operating officer. Jenab, who joined VA Linux as head of its systems division last August, will take over day-to-day operating responsibilities from CEO Larry Augustin.

In an interview last week, Augustin said financial analysts and VA Linux itself had expected better results in the second quarter but the company couldn't overcome the economic slowdown in the U.S.

"We've had very strong revenue growth, but . . . the market was looking for more," Augustin said, describing the retrenchments taking place at Linux vendors as "a normal phase in any new market."

Tony Iams, an analyst at D.H. Brown Associates Inc. in Port Chester, N.Y., said Linux vendors have had to rethink their business strategies in recent months as numerous dot-com companies have shut down or moved to sharply reduce their spending.

> We've had very strong revenue growth, but . . . the market was looking for more.
>
> LARRY AUGUSTIN, CEO, VA LINUX

Market Repercussions

E-commerce ventures had been big Linux users because of the fast deployment and low cost associated with the open-source operating system, Iams said. And VA Linux was especially vulnerable because its user base was heavily weighted toward the dot-com world, he added. VA Linux is "going to have to struggle through this," he said.

TurboLinux's acquisition of Linuxcare had been expected for several months. The combined company will keep the TurboLinux name and will be run by TurboLinux CEO T. Paul Thomas, with Linuxcare CEO Arthur Tyde III becoming chief technology officer. The financial terms of the deal weren't disclosed.

Al Gillen, an analyst at IDC in Framingham, Mass., said the acquisition is a sign of things to come in the Linux market.

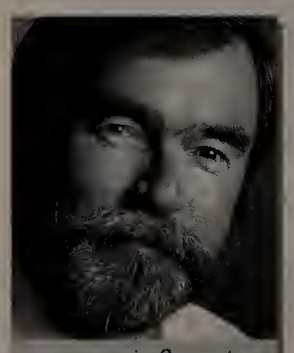
"We've expected some degree of consolidation," Gillen said. "The Linux market is very fragmented." More than 100 companies or groups are currently offering their own versions of the operating system, he added.

MARK HALL

Exit Strategy

BOB DYLAN'S VIEWS ON LOVE could be summed up in his song title "Most Likely You Go Your Way and I'll Go Mine." While a questionable approach to romance, it's the perfect advice for IT's relationship with outsourcers today.

The surge in popularity of outsourcing — with start-up application service providers and young co-location houses joining an expanding list of options — makes it likely that there will be an equal rise in messy breakups between partners. That turmoil could be mitigated if you entered each of your outsourcing relationships like Dylan embraced love — as if it were doomed from the start.



MARK HALL is *Computerworld*'s West Coast editor. You can contact him at **mark_hall@computerworld.com.**

Alas, half of you must be starry-eyed romantics. At least that's what Computer Sciences Corp. uncovered in its survey of IT management. The survey, which the systems integrator began conducting annually in 1987, revealed that last year, 51% of you didn't have an exit strategy for your myriad outsourcing relationships.

Whether the glass is half full or half empty, I can't say. But for the half without an exit strategy, your peers suggest you get one. Fast.

Our always-on Internet infrastructure demands that IT managers have outsourcing relationships — and plenty of them. But it also means you must pay closer attention to what Brian Comnes calls "outsourcing prenuptials."

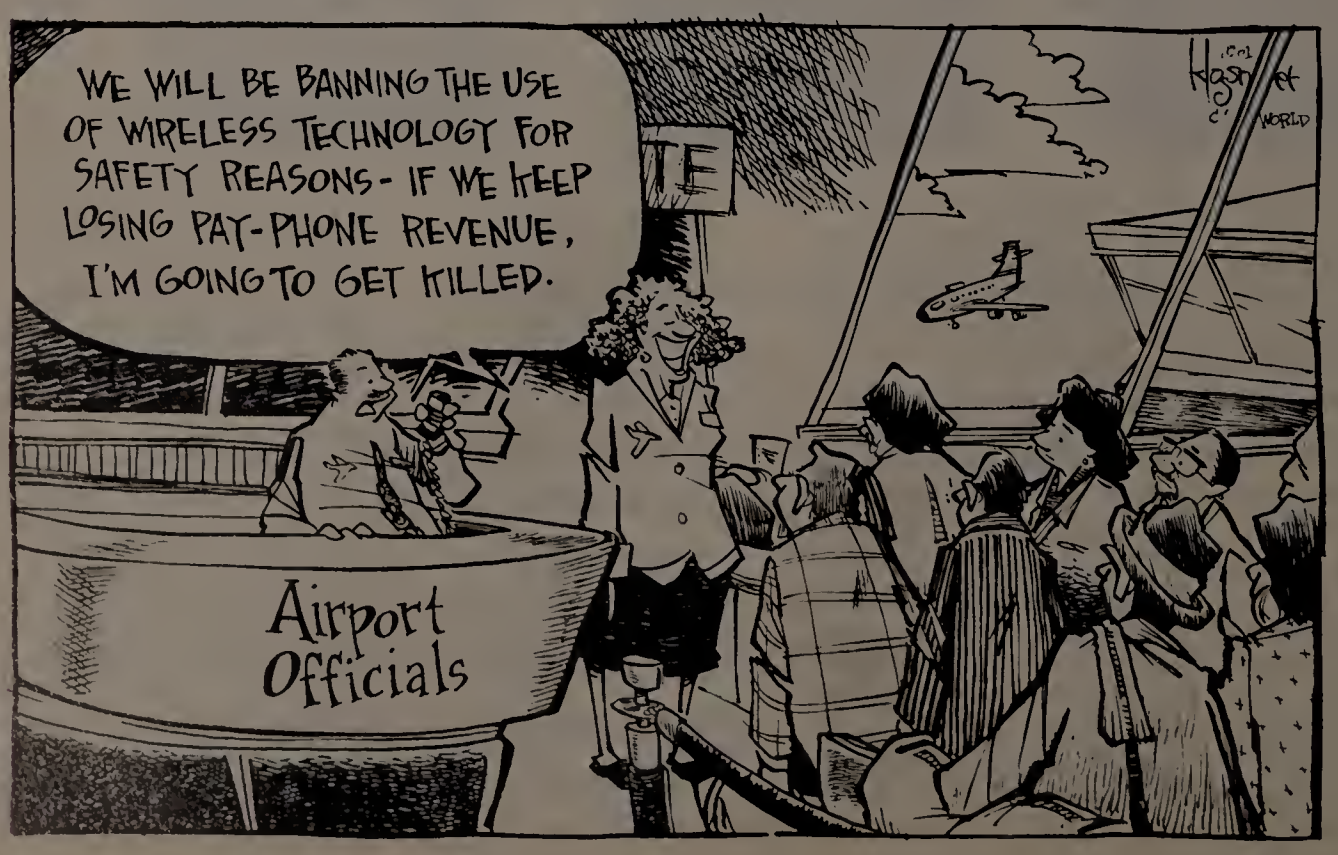
Comnes, the director of technology services at GATX Capital Finance, recently signed four contracts with various service providers and says it's critical "to have an escape clause that's acceptable to both parties."

He also advises treating outsourcers with respect. But for the young service providers, he says, it's important to establish in a contract a "no-questions-asked bailout clause" for the first three to six months.

Comnes says you should establish two service-level agreements (SLA) with your outside providers. The production agreement would be your standard performance-related contract, once the services are ready. Comnes' twist is to add what he calls a "transition SLA" that establishes how quickly an outsourcer will be able to deliver the services.

He says that to be fair, you may need to pay more than usual on the initial monthly fees to cover an outsourcer's setup costs. Comnes warns that IT managers who sign deals that call for contract termination only for cause could end up in a legal and bureaucratic nightmare trying to call it quits.

If you follow this advice, when the inevitable breakup happens, you won't be left high and dry. Or "stuck inside of Mobile with the Memphis blues again," as Dylan might have it. ◗



PIMM FOX

Potential Uses Help Brighten Future of P2P

PEER-TO-PEER COMPUTING is more than sharing music files. Indeed, beleaguered Napster is an example of just one area of P2P technology.

A P2P network allows PCs to communicate directly with one another, rather than via a server. These PCs, or "peers," offer their resources to other PCs on the network.

P2P has been around in one form or another for at least 20 years. Remember original computer modems? Their connections were P2P.

With the integration of the Internet, there is a wider array of P2P uses for large and small enterprises.

PIMM FOX is *Computerworld*'s West Coast bureau chief. Contact him at **pimm_fox@computerworld.com.**

Brian Morrow, president and chief operating officer of P2P software developer Endeavors Technology and chairman of the Peer-to-Peer Working Group (*www.peer-to-peerwg.org*) identifies cycle sharing, collaboration, knowledge management and secondary e-commerce as distinct P2P uses.

Using a P2P setup, you could put an agent on a computer to monitor hardware or software changes that would post alerts to a central source.

Cycle sharing has been popularized by the SETI@home Project at the University of California at Berkeley [Business, July 3]. SETI@home, which processes transmissions from a radio telescope in the search for extraterrestrial intelligence, has more than 2 million volunteers downloading and processing data.

The basic premise: There are PCs around the world doing nothing or very little. University of Wisconsin researchers estimate that companies use less than 25% of the computing and storage capacities that are already paid for. But don't think of P2P as being limited to PCs.

Any device — a PDA or Internet-enabled phone, for example — can behave as a peer. For instance, a call could be put out for plumbers via a P2P network. Once connected to a Web site, a user could monitor the dispatched service.

"P2P computing is all about the Internet," says Morrow.

P2P is also getting attention in health care. With such information as patient records, work schedules and product inventories on different devices, P2P offers access to files, as well as messaging, sharing and updating information.

Vertical portals serving communities of common interest are good targets for P2P. So why not let customers connect directly with one another?

Excess inventory at one hospital could be sold to another.

Yet challenges remain. New protocols are necessary, and there are significant concerns about reliability and security. In addition, management software is needed to distribute requests for resources in the network while preventing bottlenecks. Also required is a billing mechanism so users can be paid for offering their PCs. A free mouse pad won't do.

But with start-ups and notable figures such as Lotus Notes creator Ray Ozzie working on P2P technology, its future looks very promising.

DAN GILLMOR

A Note to IT: Why You Need To Know P2P

DEAR IT FOLKS:
You're a conservative crowd, frequently for excellent reasons. New technologies tend to be buggy and difficult. They can foul up your carefully planned systems. They raise security issues.

You've probably been hearing the buzz surrounding a technology known as peer-to-peer, or P2P for short, and are wondering if it's a) for real, b) useful and c) a potentially serious hassle for IT.

Yes, yes and yes. Which means you should start figuring out — today — how you're going to adopt it.

Don't confuse P2P with Napster, the music file-sharing service, even though Napster is an important example of the genre. Think of P2P in much wider terms, and please don't relegate it to something used by lawbreakers. P2P is about a profoundly valuable notion: We're not even beginning to use all the power of the machines and people at the edge of our networks, and the intelligence and creativity at the edges will provide some of the greatest value as we move forward.

DAN GILLMOR is technology columnist at the *San Jose Mercury News*. Contact him at **dgillmor@sjmercury.com.**

Some people define P2P in ways that are almost too encompassing. One concept seems central, however. Every client — that is, every PC and any other device connected to the Internet — should also be a server in some sense, dishing out computing cycles or information to other devices. It's decentralization in the broadest possible way.

Lots of people are working on these notions. I'm especially entranced with the value of turning clients into servers, returning the Internet to its early promise. That's the way the Web was supposed to work before corporate interests turned it into a mostly read-only medium, after all. We're moving into a world where the sharing of information is vital, and this is going to make the process vastly more efficient.

If P2P isn't just about copyright violations, what's in it for IT? Plenty, in the near term. With adequate encryption and other protections, for example, file sharing could be a better way to back up vital information. Computers could look over one another's shoulders, in a virtual buddy system, to keep an eye out for viruses or other problems.

There are serious security and architecture issues, and the P2P community will have to address them quickly and honestly. Some of the niftiest P2P applications I've seen appear to turn firewalls into sieves — and systems administrators will have every right to see proof of safety first, not later. The P2P systems people will also have to figure out how groups of devices and users will get together in the first place and how we'll connect groups of groups in coherent, useful ways.

But IT needs to adopt P2P for precisely the same factors that led you to adopt PCs, LANs, client/server and the Internet/intranet genres. They brought benefits. They were, in a sense, inevitable.

Don't underestimate the inevitability factor. As several people at a recent conference in San Francisco noted, P2P is probably the only workable architecture in a world where billions of devices will be connected to networks. Today's client-server architecture simply won't be able to handle such a large universe.

That's why the biggest names in computing are moving toward P2P — and why you need to be looking closely, too.

READERS' LETTERS

What Is Private?

SAMI LAIS' "No More Secrets" [Future Watch, Feb. 19] was an exceptionally well-thought-out article. Two particular items would help both government and private agencies in determining what is private. First is the notion of choice; much of the pain over privacy could be eliminated if a reliable method of letting people opt out of databases, preferably en masse, was developed and deployed. Second is an honest accounting of what is being collected and its uses.

Lex Rutter
Tulsa, Okla.

The Developer Angle On User Interfaces

JEF RASKIN focuses too much on the user and ignores the other half of the equation ["The Interface Revolutionary," Future Watch, Feb. 5]. Software developers need clear guidelines and even restrictions to ensure that users enjoy consistent experiences across applications.

I believe that acceptance and enforcement of these guidelines is why the Mac and Windows interfaces have dominated, while open-source packages like Linux have failed to capture many followers.

With hundreds of millions of PCs in use, implementing fundamental changes in the standard user interface presented by Windows or the Mac OS might prove as difficult as telling people in the U.K. that they must drive on the right side of the road.

Consistency, depth of implementation and connectivity are the key elements of interface design. Art and elegance round out the mix. It's easy enough to put up some colorful icons, but making everything work consistently three or four levels down is where most interfaces fail to deliver.

James McSheehy
Spectrum Technologies
Suwanee, Ga.

University Defenses Are Strong Enough

THE FEB. 12 cover story ["University Computers Remain Hacker Havens"] was very interesting, but it incorrectly portrays universities as being the weakest link in the security chain. The fact is that when we get hit, we report it, share it with our colleagues and call the cops, the press and anyone we can think of. The same is not true of commercial sites, which, by their own admission, drastically underreport incidents so as not to erode investor/customer confidence.

William Dougherty
IT specialist
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Blacksburg, Va.
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DEBORAH RADCLIFF makes it sound like it would be hard for universities to protect their connections. This is bull. Universities connect to the Internet the same way everyone else does, through smart routers. The distributed denial-of-service attacks would be impossible if outgoing traffic from universities were filtered for return addresses not from within.

Kevin English
Software architect
Austin, Texas
english@austin.rr.com

Silicon Heaven

THANK YOU for the sly and witty article on "Silicon Mesa" [Technology, Feb. 12]. It was clearly influenced by sneaky New Mexicans like me who want to slow the rate of growth of our beloved state. As one who finds my desk covered with résumés from Silicon Valley refugees, I can't agree with most of the people quoted, but I'm willing to play along in order to keep my own piece of heaven to myself.

I will agree that most people who move here are, in fact, moving at least partially for lifestyle reasons or the environment. I will also agree that many of the opportunities involve leading-edge applications in entrepreneurial environments. So if you have relevant experience and want to live and work in a beautiful place, then I suppose, just maybe, we'll let you in.

Bill Lyon
Senior software engineer
Prediction Co.
Santa Fe, N.M.

It's That Simple

IF THEY HAD any true marketing ability, companies would recognize that by protecting customers' private information, they will retain them as repeat customers ["Legislating Privacy May Hurt Bottom Line," News, Feb. 5].

M. Boorom
Alexandria, Va.

More Letters, page 29

COMPUTERWORLD welcomes comments from its readers. Letters will be edited for brevity and clarity. They should be addressed to Jamie Eckle, letters editor, Computerworld, PO Box 9171, 500 Old Connecticut Path, Framingham, Mass. 01701. Fax: (508) 879-4843. Internet: letters@computerworld.com. Include an address and phone number for immediate verification.

Windows 2000 ADVANTAGE

The Web Magazine for IT Leaders Implementing Windows 2000 and Windows NT with Compaq Services and Solutions

Online this week:

POINT OF VIEW

Compaq Integration2000 delivers enterprise e-commerce solutions

Integrating enterprise applications recently got a boost with Compaq's Integration2000. The initiative helps solve the largest, most difficult business integration problems.
www.windows2000advantage.com/pov/12-11-00_integration.asp

TECH EDGE

Windows 2000 enhances storage management, disaster recovery

Microsoft Windows 2000 features that fine-tune how information is stored, distributed, backed up and recovered in an enterprise-class data center are making life easier for companies such as EDS.
www.windows2000advantage.com/tech_edge/02-05-01_disk_disaster.asp

Q & A

Aberdeen Group analyst says Windows 2000 ready for reliability prime time

Tom Manter, research director at the Aberdeen Group, finds that dot-com and enterprise computing users increasingly choose Microsoft Windows 2000 over Windows alternatives.
www.windows2000advantage.com/qa/01-29-01_aberdeen_reliability.asp

COLUMNS

The Windows 2000 tide is turning

After a rocky beginning, Microsoft Windows 2000 is coming around. How do we know? Because our readers are saying so.
www.windows2000advantage.com/columns/01-08-01_turning.asp

CASE STUDIES

RadioShack, Starbucks blazing Commerce Server 2000 trail

Before Microsoft's Commerce Server 2000 hit the street, it went through an extended beta testing trial with top-tier companies. Two of them, RadioShack.com and Starbucks used it to accomplish specific e-commerce goals.
www.windows2000advantage.com/case_studies/01-22-01_commerce.asp

FEATURES >

One year old, Windows 2000 is growing up fast

On its first birthday, Microsoft Windows 2000 has established itself as a staple in Web server environments, and is slowly making its way from the front end of IT shops to the back end of data centers. In the process, it's delivering significant savings and reliability and making life easier for users.

For the full story, visit: www.windows2000advantage.com/features/02-19-01_birthday.asp

FEATURES >

Part II: Compaq's massive, methodical Windows 2000 migration

At the start of the new year, Compaq's corporate-wide Microsoft Windows 2000 migration project was making noteworthy progress. The new infrastructure, based on Windows 2000 and Active Directory, was in place at almost all of Compaq's big corporate sites, and about a third of all user accounts were migrated. Completion of the infrastructure is expected early in the second quarter of this year.

For the full story, visit: www.windows2000advantage.com/features/02-19-01_massive_migration.asp

FEATURES >

Internet Security and Acceleration Server 2000 is a big improvement over Proxy Server 2.0

Microsoft's Internet Security and Acceleration Server 2000 (ISA Server 2000) is an enterprise-ready multi-layer firewall and high-performance Web caching server. As part of the growing family of Microsoft .Net servers, ISA Server 2000 takes full advantage of the management and security features built into Windows 2000. It is also integrated with the other members of the .Net Server family.

For the full story, visit: www.windows2000advantage.com/features/02-12-01_acceleration_server.asp

www.Windows2000Advantage.com/300

ROUNDTABLE >

Windows 2000 users home in on desktop issues

At a recent Microsoft Desktop Deployment conference held in Denver, Colo., three attendees met with Windows 2000 Advantage managing editor, Stefanie McCann, to discuss deploying Microsoft Windows 2000 on the desktop. The enthusiastic participants quickly got down to business and said how impressed they were with the operating system's, security, and its overall reliability. They also lauded other features, including portability, Active Directory and power management. The participants of the roundtable included: Travis Sanders and Donald Bizelli, systems analysts for WorldCom in Colorado Springs, Colo. and Frank Clark, CEO, Design Enterprises, Denver, Colo. and independent computer consultant.

Q: Did the conference deal mostly with deploying Windows 2000 on the desktop, or did you get into server deployment?

Sanders: We touched on server deployment just a little bit.

Q: When are your companies going to start migrating to Windows 2000?

Bizelli: There are rumors that we may start migrating as early as April.

Q: Is that just the desktop or server and desktop?

Bizelli: That is going to be the desktops to start with and then we'll migrate the servers.

Clark: For me it varies because the different companies that I consult with. Some are already on Windows 2000, some want to upgrade and others want to stay with Windows 98. What I do is a lot more of the desktop-type stuff. I work with SOHO's up to medium-sized businesses. And most of them buy for the desktop, especially the small office, home offices. I don't see a need for servers in that space. But the small and medium-sized businesses are seeing more of a need for client/server networks versus just the pure network.

For the full story, visit:www.windows2000advantage.com/roundtables/02-12-01_users.asp

QUOTE OF THE WEEK >

"Everything I have touched, I have installed Windows 2000 on and I've beat the heck out of it. It is great."

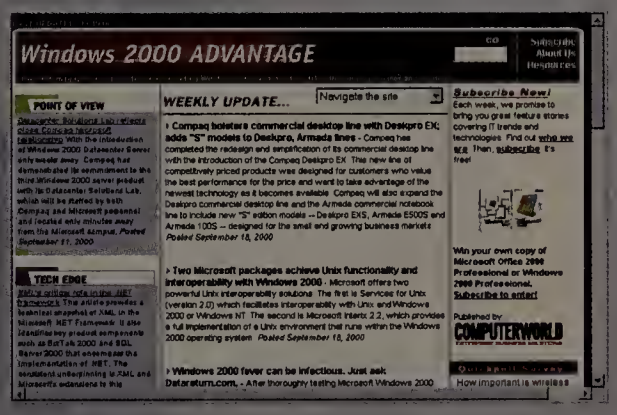
— Travis Sanders
systems analyst
WorldCom
Colorado Springs, Colo.

What is Windows 2000 Advantage?

The mission of Windows 2000 Advantage is to become your primary source of timely, useful information for planning and implementing Microsoft Windows 2000 on Compaq solutions and services.

Windows 2000 Advantage is a Web-only magazine because that lets us bring you, the IT leader, great stories that apply to your day-to-day work. We'll keep you up to date with a weekly e-mail alert so you don't miss a thing.

Windows 2000 Advantage is underwritten by Microsoft and Compaq. Its charter is to address the issues that most concern IT managers charged with keeping their companies on top of the latest and best solutions Microsoft and Compaq have to offer. Toward that goal, we offer a wide range of stories including case studies, columns and news to provide you with information you can't find anywhere else.



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DAVID MOSCHELLA

The Broader Lessons From the Napster Case

NAPSTER HAS BEEN a great idea and a great service. Yet the music industry had no choice but to sue the company, and the Federal Court of Appeals' near-fatal anti-Napster decision was predictable. There are many ways of selling music online, and Napster chose by far the most controversial.

But before you ask, "Why should I care?" consider that the lessons of Napster actually extend far beyond the music industry or even copyright law. Whether you're in retail, finance, manufacturing or one of the various "content" industries, the Web has given new prominence to the principle of aggregation. Drawn from the same Latin root as congregation and segregation, aggregation is defined as the *flocking together* of similar items into a wider, more complete collection. It's something the Web is very good at.

DAVID MOSCHELLA is vice president of knowledge strategy at Meansbusiness Inc., a Boston-based Internet start-up that's building a database of ideas. Contact him at dmoschella@earthlink.net.

Certainly, there are all manner of aggregators on the Web today. Napster aggregates music, Priceline aggregates discount travel reservations, eBay aggregates auction items, Amazon aggregates books and portals aggregate just about every form of content you can think of. With all this aggregating going on, it's worth understanding how such markets are formed and which of the various aggregation models are likely to prove the most successful. In my own work in this field, I have identified the following five broad patterns:

1. Strong vendor leadership. The best example of this would be the airline reservations systems initially developed by American Airlines that now includes all major U.S. carriers. Bertelsmann's efforts to build a joint service with Napster might someday repeat this pattern.

2. Consortium-led. The automakers' exchange, Covisint and other business-to-business exchanges are good recent examples of how market leaders can come together to aggregate their own marketplaces, but this pattern was established long ago by organizations such as Nasdaq, Visa and MasterCard. Certainly, the recording industry could build its own Napster, although there might be some serious antitrust and time-to-market issues.

3. Permission-based. Priceline works with airlines and hotels to resell excess reservation inventory. But Priceline's complete dependency on its partners is one reason why it's so vulnerable.

4. Voluntary. All merchandise on eBay is placed there voluntarily by the sellers; no permissions or licenses are required.

5. Fair use. Services such as Napster simply assert that what they're doing is legal under today's vaguely defined "fair use" principles. Although fair use is sometimes the fastest way to launch an aggregation business, this approach becomes increasingly less defendable as the service grows.

All of these models have their strengths and weaknesses in terms of their profitability and competitiveness. But taken together, they demonstrate how new forms of aggregation are spreading across our economy. Think about which patterns are becoming part of your own industry.

But the main thing to remember is that in successful aggregations, all sorts of new value is created, such as new products, more choice, more information, more targeted marketing, advertising possibilities and cross-selling. This spurt of new value creation explains why so many companies seek to keep control over their marketplaces. The fact that many Internet aggregation businesses are mostly winner-take-all competitions provides another huge incentive. As much as consumers love Napster, the music industry's resistance was justified and inevitable. ◗

MICHAEL GARTENBERG

Best Days for Microsoft May Still Be Ahead

MICROSOFT HAS BEEN making plenty of news recently, namely with the introduction of X-Box and Windows XP, the appointment of Rick Belluzzo as president and chief operating officer and the downgrading of the stock by no less than noted high-tech stock analyst Henry Blodget. As Microsoft celebrates its 25th anniversary, are Redmond's glory days behind it? Or are the best yet to come?

MICHAEL GARTENBERG was lead Microsoft analyst when he was a vice president and research area director at Gartner Group Inc. He's now a partner at Hudson Ventures, a venture capital firm in New York. Contact him at mgartenberg@hudsonptr.com.

Let's look at some of the issues. Blodget downgraded Microsoft on the basis that no company has succeeded when moving from an old paradigm to a new one — in Microsoft's case, from the desktop PC to the Internet.

But the facts don't support that. Since Microsoft began its assault in earnest on the Internet, it has managed to displace Netscape with Internet Explorer as the overwhelming browser of choice, created a strong online brand via Microsoft Network and built a platform for e-commerce and Web solutions that's successful by any standard. Oh, it also does that old desktop PC thing pretty well.

That's the key to Microsoft's success. Rather than resist trends, it has always focused on the idea of "embrace and extend," which allows it to attack multiple markets simultaneously. That's what's behind Belluzzo's promotion from his 18-month-long stint as vice president of the company's consumer division. Microsoft needs someone who understands its traditional business customers and its renewed shift to consumers.

An overall logical assessment of Microsoft would indicate that its future looks bright. While PC sales have slowed overall, Microsoft has been working carefully to enter new markets, such as handhelds with the Pocket PC and the home market with the X-Box. Today, Compaq's iPaq, which is based on the Pocket PC platform, remains in high demand and short supply and challenges Palm's offerings at the high end of the line. Based on early previews by those who cover the video game space, the X-Box's planned introduction in the fall will be a major success. Initial projections say that if Microsoft can meet demand properly, it will make a grand entrance and give Sony and Nintendo a run for their money.

At the other end of the spectrum, Microsoft is preparing the Whistler release of Windows, now known as Windows XP. This will finally unify the core base of the Windows operating systems under the Windows NT kernel. More important, it will provide the base of Microsoft's "digital hub" for business and consumers in an era of multiple devices and ubiquitous computers. Unlike Windows 98 or Windows 2000, with its business focus and limited marketing push, XP will offer major advantages to consumers and business users in much the same way Windows 95 did. Microsoft's likely promotion of XP will probably exceed the initial hype of Windows 95, and a steady hype for XP will help make it very profitable.

More than ever, Microsoft needs to wage war on several fronts. It must convince users that the rich experience of the PC is valuable over dedicated information appliances. It must also focus on digital appliances such as the X-Box and Pocket PC that complement traditional PCs and make a strong case for a migration to its Internet-based .Net services. The combination of Belluzzo's experience in the consumer division, coupled with the enterprise expertise of Steve Ballmer and Bill Gates, will serve Microsoft well in its strategic battles over the next several years.

I've often said that Microsoft's name alone evokes an emotional response. The conventional wisdom is "Love them, hate them, admire them or stand in awe of them — in today's world of technology, you can do anything but ignore them." More than ever, that statement is true. Microsoft's approach in attacking the traditional PC markets and combining them with Net-based and information appliance-based offerings will likely yield a formula for success and a bright future. ◗

You think
your company's
online.
But it's not.

The bridge between the paper world and t

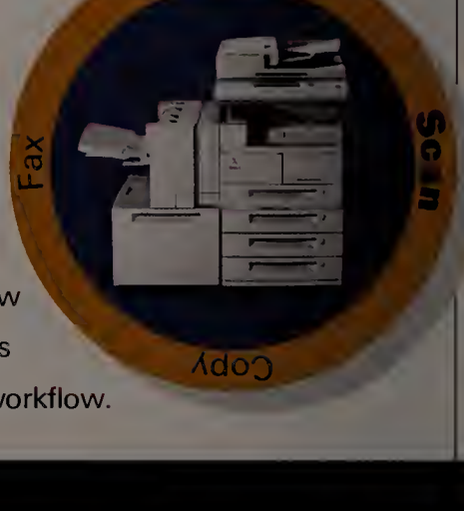
Your investment in IT infrastructure is huge. And the impact of the Internet on your IT budget grows larger every day. You've poured tons of resources into ERP systems as well as e-mail and document workflow systems. How much? Well, studies show that as much as 50% of an average IT budget can be involved with managing documents.

❑ True, there are more documents online than ever before. But it's also true that we are creating more paper documents than ever before: twice as many as just five years ago. The reason is simple: Most companies have lots of off-ramps that turn electronic documents into paper documents, but almost no one has lots of on-ramps capable of converting paper documents into electronic ones.

❑ In fact, giving you new ways to leverage your IT investment by bridging the frustrating gap between the paper world and the electronic world is exactly what the Xerox Document Centre system was designed to do.

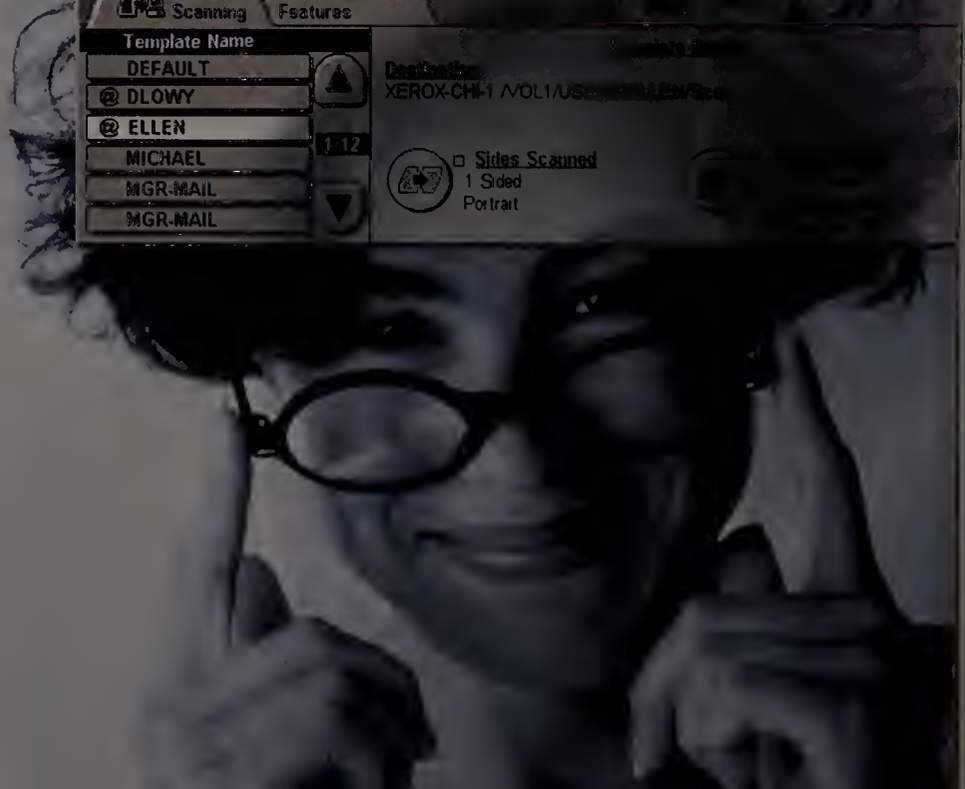
❑ For starters, a Document Centre lets people work the way they are used to working—you can scan documents in the same place you print or copy them—it's that easy and that accessible. Of course, the Document Centre gives workgroups of 10 or more desktop control over everyday functions like printing, copying, PC faxing and finishing. What's more, by making document imaging an "everyday" function, the knowledge and information recorded in paper documents can now become a seamless part of the digital workflow.

XEROX DOCUMENT CENTRE



It's about document imaging for every workgroup.

If scanning is on your radar at all, you probably see it as limited to environments with dedicated operators. And so it has been. But the Document Centre system is changing that in big ways.



the online world is now open for business.

Scan directly to the Web or virtually anywhere else you want to.

Going out to the hallway and scanning large documents into the digital stream at up to 65 ppm is certainly efficient, but the important question remains: Where is all that information going, and what can you do with it once it gets there?

❑ Document Centre lets you scan directly to industry-standard messaging and collaboration platforms like Microsoft Exchange, Lotus Notes or Domino.Doc.

Scan 65 ppm

3 easy steps

1 Select scan folder
2 Select destination
3 Press green button

❑ You can scan directly to a Web repository, so anyone has instant access to information from a remote location.

❑ Scan to your PC desktop, and with ScanSoft PaperPort and TextBridge software bundled with Document Centre, you can drag and drop your scanned image into any one of 150 industry-standard applications. You won't need to re-key your documents.

OPEN ARCHITECTURE SYSTEMS

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Adobe PostScript 3

❑ Or scan documents to the network, and using software like Xerox DocuShare, users can access them through any current Web browser on any platform. It gives you an electronic file cabinet that's a very efficient way to share knowledge and dramatically reduces e-mail traffic.

❑ Or combine Document Centre with Xerox FlowPort. FlowPort is a Web-based software platform that manages the flow of documents from paper to digital and back again in dramatically new ways. For example, FlowPort gives mobile workers the freedom to access and print any documents on the Web without using a PC.

The Web
Microsoft Exchange Public Folders
Lotus Notes
Xerox DocuShare
Lotus Domino.Doc
PC Desktop

❑ And when it comes to getting your digital documents back into paper form, Document Centre's open architecture supports all major industry printing standards and encourages third-party software solutions to thrive. So you can print not only from your desktop or from the Web, but also directly from your mainframe, including ERP applications like SAP.

❑ In short, things once limited to paper are electronically archived, accessed, shared and easily printed wherever you need them. It doesn't just increase productivity, it decreases costs and saves time. Turn the page to learn how one of our customers is already benefiting.

Paper or digital, it's about solutions that leverage the network.

We have hundreds of customers who report impressive results. But here's one in-depth story of how a Document Centre solution reduced one organization's work-cycle time from three days to just three minutes.

The Customer:

Center for Technology Management, in a prominent Midwestern research institute.

The Problem:

There are dozens of huge file cabinets overflowing with documents—patents, notes and contracts about inventions the university owns. Each year up to 1,500 new folders are added. Every day, dozens of people call and request files. By law, the university must provide public access to any of these thousands of complex scientific documents for reference, revision, notation or collaboration. And it must be done for 25 years. The commitment of time, space and personnel is large and growing.

The Solution:

Combine Xerox FlowPort and DocuShare with two Document Centres. This gives you a search engine for all your documents.

Now when people need a document, they just check off the file they need on a FlowPort cover sheet, scan it into the Document Centre, and FlowPort software finds and sends the requested electronic file to a server that can print, e-mail or store the document. What's more, once the file is stored, DocuShare lets you manage it on the Web, giving authorized users instant access for viewing, downloading and printing documents from anywhere at any time.

The Result:

A process that used to take three days can now be completed instantaneously. Documents are accessed and shared electronically. Paper is eliminated while collaborative work processes are made simpler. Security is improved. Those 20 file cabinets are soon history. Costs are lowered. Time is saved.

Online or off, it's about a simpler way to share knowledge.

In a world of intranets and extranets, of e-commerce and the Internet, you need state-of-the-art technology and expertise to manage and share the documents that contain the knowledge in your organization. The Xerox Document Centre is a digital platform engineered from the ground up to eliminate the barriers between your paper and online documents.
Call us or visit our Web site for more information. And see how much you can increase productivity and control cost just by getting all your company's documents online.

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Dell: A Missed Opportunity

I DON'T KNOW how Dell can say that the closing of its B2B marketplace doesn't send mixed messages about its commitment to the Internet ["Dell Closes Marketplace After Four Months," News, Feb. 12]. It definitely gave up on this too quickly and may regret it in the next 12 to 36 months.

Bob Rogers
E-business consultant
Contivo Inc.
Burlington, Mass

Stage Flight

EVEN THE New Economy of the Internet falls nicely within the Stages of Growth theory of Richard L. Nolan, the William Barclay Harding professor of management of technology at Harvard Business School. Using that theory, the New Economy can be seen as having gone from the local technical whizbang of Stage I to the enterprise and strategy-shaping technology of Stage VI.

Carl Hardeman
Manager of IT
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carhar@rocketmail.com

Can You Be *Too* Wired In?

I LAUGHED out loud at Maryfran Johnson's "Hooked on Connectivity" editorial [News Opinion, Feb. 5]. So true! At last check, I figured I have 12 ways to reach me or leave a message, and I am going nuts checking them all.

Cherie Gary
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Bush Suggestion Off-Base

BILL LABERIS had a couple of well-thought-out points in his column "Four Ways for Bush to Make His Mark on IT" in the Feb. 5 issue. Another sounds good on the surface but has problems. However, his first suggestion is that President Bush ignore his oath of office and subvert the actions of the Justice Department. Apparently, Laberis has never read any portion of the antitrust laws.

Charles J. Lingo
Denham Springs, La.

The Fix That Wasn't

THE ARTICLE "Spread of Kournikova Virus Highlights Security Lapses" [News, Feb. 19] failed to mention significant incompatibilities with Microsoft's "fix" for the Outlook e-mail program released eight months ago. Enterprise applications that use Outlook and rely heavily upon Microsoft Exchange Server to transport information don't work properly with the patch applied.

Evan Wagner
Director of IT
Convera
Vienna, Va.

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BUSINESS

THE NEW CFO

Not too long ago, chief financial officers had to pay attention only to the numbers. But in today's world of e-commerce, mergers and acquisitions, and capital-intensive IT investments, CFOs who don't understand technology can't understand business. ▸ 32

THE RETURN OF THE INVESTOR

Venture capitalists may have been spooked by the dot-com crash for a while, but now they're back in force, writes Kevin Fogarty. The difference, though, is that they're no longer betting on CEOs with little more than slick presentations. This time around, investors are looking to put their money behind technologies that can improve the core of the all-important network. ▸ 32

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As security concerns grow within companies, technology firms are racing to provide outsourced technology services such as virtual private networks, intrusion-detection analysis and security architecture design and management. ▸ 34

WILD ABOUT IT

At the National Wildlife Foundation, the communication effort is critical. The organization's 11 geographically dispersed field offices all need to get out to constituents for projects, but they still need to work together. That's where IT comes in. ▸ 35

NOW'S THE TIME TO INVEST

Companies have spent the past few decades investing in their IT infrastructures, writes Jim Champy. But now the time is ripe to make IT investments that can take advantage of the full impact of the Internet, he advises. ▸ 35

KEEPING THE RITE STUFF

With recent multimillion-dollar losses, allegations of software-based consumer fraud, computer problems at an advanced distribution center and a new CIO, Rite Aid's 500 IT staffers are more cautious than ever. But the pharmacy chain must be careful to not cut IT spending — and experimentation — too deeply. ▸ 38

POISED FOR ADVANCEMENT

Steve Schuckenbrock, chief operating officer at The Feld Group, says he's a strong believer in two things: "One is that you make your own opportunities; two is that you're not in constant hunt for the next one." Instead, Schuckenbrock advises that you "immerse yourself in the job that you're in, and it creates opportunities for you." ▸ 42

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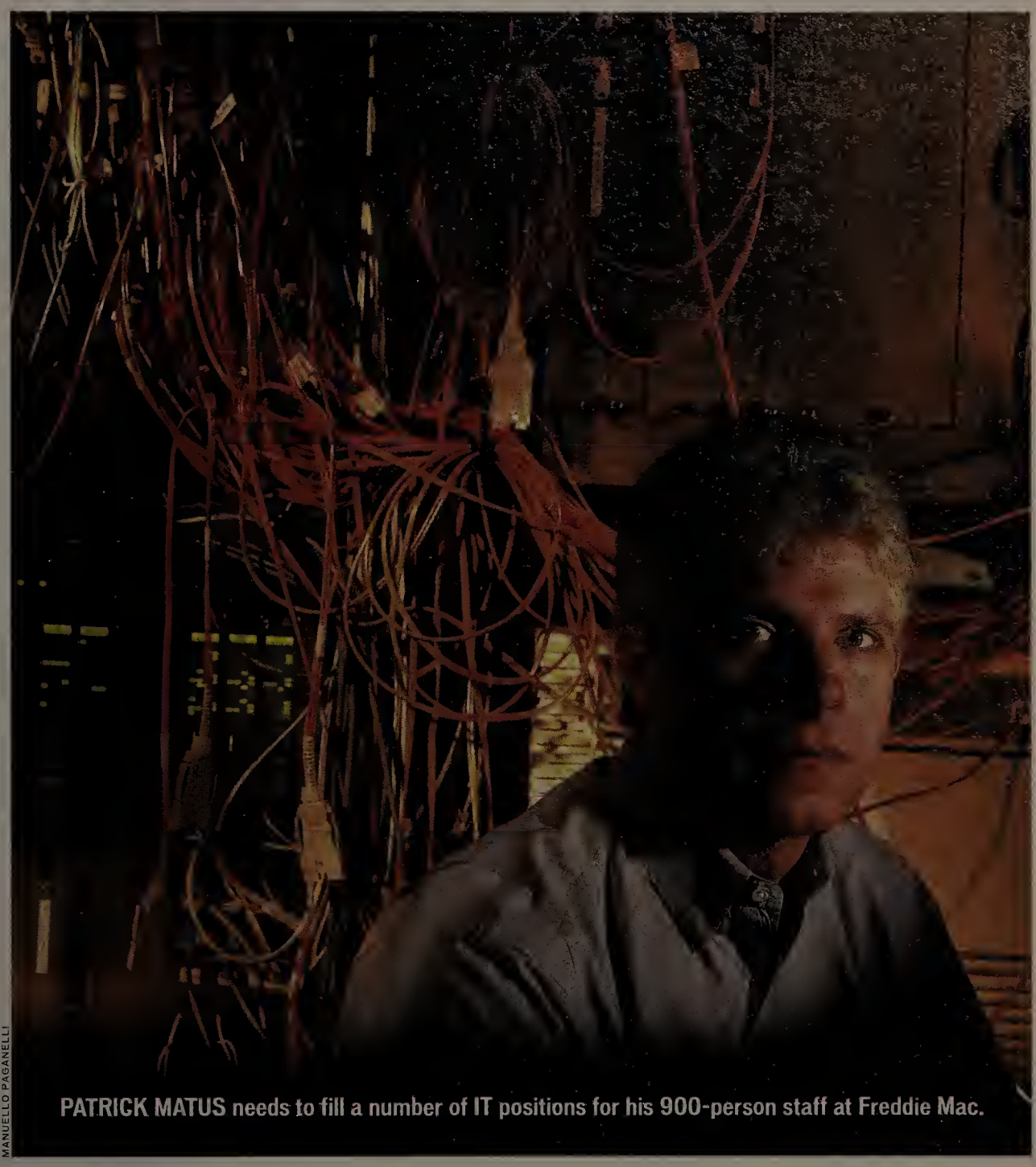


MANUELLO PAGANELLI

PATRICK MATUS needs to fill a number of IT positions for his 900-person staff at Freddie Mac.

THE TOP 10 HOT IT JOBS FOR 2001

EVEN IN A COOLING ECONOMY, some jobs remain hot. *Computerworld* asked national recruiters and staffing firms for their observations and predictions, and from those interviews, we compiled our list of the top 10 IT jobs for 2001. Web developers, database administrators, security specialists and Java programmers, take heart: Companies out there are looking for you.

40

CFOs Race to Keep Up With New Technology

Understanding IT now key to good finances

BY MARIA TROMBLY

Walter Leen still remembers the days when the IT department was called data processing and it reported to the chief financial officer.

"It was just used as a big, fast calculator and a fast typewriter," Leen said, who recently retired from his job as vice president of internal auditing at Itasca, Ill.-based Enesco Group Inc. "But the CFOs had no idea of its capabilities to provide management information."

Now, CFOs — whose focus is often on the bottom-line results of specific markets but not the technological arcana that affect them — need to understand new tools that can give them a clearer picture of their companies' financial health, according to Ian Rubin, an analyst at IDC in Framingham, Mass.

E-commerce, mergers and acquisitions, and capital-intensive IT investments also require the CFO to stay on top of the latest technology trends.

That doesn't mean they have to know how to program a Web site, Rubin said, but the more they know about new technologies, the better positioned they are to judge the success of any particular project.

Willingness to Adapt

For example, San Rafael, Calif.-based Autodesk Inc., which sells AutoCAD and other design software, gets half of its business through the Web, said CFO Steve Cakebread. In addition, about a third of the company's suppliers take payments in electronic form.

"And we're always talking to our suppliers — 'You need to get more automated; your money is going to get to you faster,' " he said.

Dramatic growth, fueled by the Web, has also forced Lynn Atchison, CFO at business information provider Hoovers Inc. in Austin, Texas, to be more flexible in her job. "How do I, as a CFO, ensure that our site is going to produce revenues?" she asked. "One year, we think subscriptions are the main thing. The next, it's advertising. Now, I think it's gone full circle — back to subscriptions."

At a minimum, she said, today's CFOs need to understand the vocabulary of the Internet and how to use new technologies to launch a marketplace.

To help CFOs meet the increasing challenges of their jobs, IT departments need to take a more active role in educating them, said Anita Tilley, managing director of KPMG Consulting LLC in McLean, Va.

"Most finance departments that I have had the pleasure of working with have done a fairly good job of Finance 101 for their organizations," she said. "On the other hand, IT is dealing with a phenomenally fast-changing environment." However, IT organizations are starting to catch up, she added.

Fostering good communication gives the CIO a champion to help sell strategic initiatives and gives the CFO a background in technology that can change the structure of a company, especially during tough economic times, Tilley said.

The recent economic downturn makes such cooperation even more urgent. "Anytime that there's a perception of an economic downturn, the pressure is heated up for cost justification of various initiatives," Tilley said. "The challenge is making sure that both [IT and finance] are properly supporting each other in terms of making sure that the right business case is there."

SANKARAN: Speed of business outpaces financial planning.

"Conventional budgeting and planning happens once a year," said Chandran Sankaran, CEO of Redwood City, Calif.-based Closedloop Solutions Inc., which provides software that CFOs can use for financial planning.

"So now, CFOs are in a really hard place because the speed of business is accelerating," Sankaran explained. "A purchase order, for instance, that used to take three weeks to get authorized and go out the door now takes 30 seconds. As one CFO told me, stupid decisions are being made faster. There is a massive gulf that is growing between the speed at which the business is operating and the speed at which CFOs can realign the financial resources of the company." ◗

KEVIN FOGARTY/BRICKS AND CLICKS

VCs Finally Bet Right

EVER NOTICE that nothing whets the appetite for risk like failure — at least among venture capitalists and other gamblers?

Yes, they're back. After a brief cooling-off period following the dot-com crash, high-tech entrepreneurs and venture capital firms are heating up their romances again, albeit much more carefully this time.

Plenty of seed money is once again available for start-ups, but not the ones whose main assets are a glib CEO with a slick presentation, a clean exit strategy and "the right cornflower-blue shirt," according to Guy Kawasaki, CEO of online investment bank Garage.com.

Kawasaki recently told an entrepreneurial conference crowd at UCLA that to get funded, start-ups need truly innovative technology, a product that actually exists and a business model that includes profits long before any plans for an IPO.

"We're looking for more Excel, less PowerPoint," Kawasaki said.

The Internet economy wasn't a bubble that burst, he said; it's more like a tide. "And sometimes the tide goes in; sometimes it goes out," he said. "Right now, it's out."

True, said Anne Winblad, a partner at legendary venture capital company Hummer Winblad Venture Partners. But, Winblad told the same crowd, the Internet economy isn't a newly hatched being that might not survive its first exposure to low tide. It's actually a technology-fueled phenomenon that has been going on at least since the early days of the PC revolution 20 years ago, she said.

KEVIN FOGARTY is *Computerworld*'s features editor. Contact him at kevin_fogarty@computerworld.com.

In fact, the value of the last major wave of technology innovators is just starting to appear. Client/server software companies like Siebel that have been plugging away for years are just now beginning to have a major impact.

"HP wasn't built in a day," she said. It took six or seven decades.

Most of *Computerworld*'s readers don't work at the future HPs of the world, though. They're less interested in how to fund start-ups than they are in how to use IT to improve their own businesses. They have to spend their R&D dollars on products they actually sell, not on risky technology research projects.

That's why start-ups and venture capitalists exist — to bet their money and careers developing technology the rest of us may or may not be willing to pay for later. If they hit, they get rich. If they don't.... Well, you've been reading about those in *The Wall Street Journal*.

The good news is that VCs are now betting on stuff that might actually be useful.

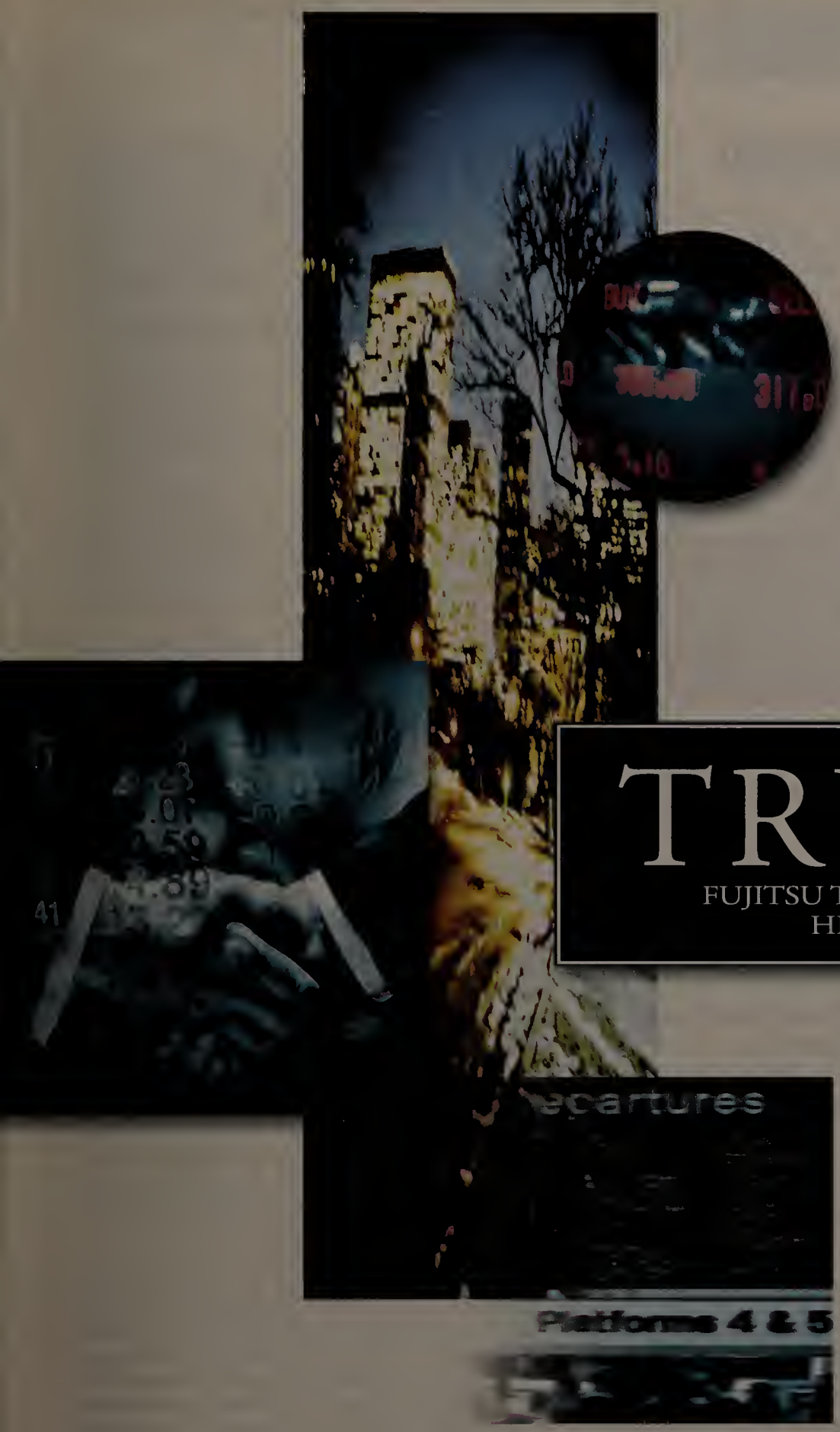
Look for newcomers like Caspian Networks — a secretive San Jose start-up led by Arpanet pioneer Dr. Lawrence Roberts, whose as-yet unannounced plan is apparently to add intelligence and efficiency to the Internet by combining the capabilities of optical and packet-switching technology to create a network with big pipes and the intelligence to use them efficiently.

Also look for companies trying to improve the intelligence of the dirt-stupid access devices on the edge of the network so requests for data or processing can be shared among many devices, not just passed to big servers at the core of a network. (Think of the Napster or SETI@home model of computing, but to benefit corporations, not music-hungry teens or xenophiles.)

Of course, both bandwidth and CPU cycles are incredibly cheap these days, so these relatively practical schemes may turn out to be less than attractive, even for large-scale, demanding networks. (But compare them with dot-com plans like delivering pet food via FedEx, or making money by giving away your intellectual property, and smartening up a network that may not need smartening looks pretty reasonable.)

True, these aren't the wild bet-a-billion schemes that were promising to replace the old economy.

But fortunately, the gamblers are back, placing bets that could benefit those of us who use technology, not just those who fund it. ◗



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Outsourcers Rush to Meet Security Demand

BY JAIKUMAR VIJAYAN

An increasing number of firms are rushing to offer outsourced security services in anticipation of a spurt in demand.

During the past several months, companies such as Internet Security Systems Inc. (ISS), Riptech Inc., Ernst & Young International, Foundstone Inc., OneSecure Inc., Guardent Inc. and Counterpane Internet Security Inc. have rolled out services aimed at helping firms manage key aspects of their security.

Their services include managing firewalls and virtual private networks (VPN); performing vulnerability analysis, intrusion detection and antivirus protection; and, in some cases, even designing, implementing and managing security architectures. Driving the demand for these services is the shortage of security professionals and the complexity of implementing and maintaining enterprisewide security architectures, said Allan Carey, an analyst at IDC in Framingham, Mass.

Most outsourcing today is limited to managing firewalls and VPNs and providing intrusion-detection services. Users retain control over all security policies and architectural decisions, users and analysts said.

But "over the next four years, we expect to see companies outsourcing pretty much the whole security life cycle to third parties," Carey said.

As a result, the demand for third-party security services will exceed $17.2 billion by the end of 2004, according to IDC.

Managed services address a crucial need for many companies, said Ron Hilliard, a network manager at Health Alliance Plan (HAP), a major health maintenance organization in Detroit. The company outsourced all of its firewall management functions to Atlanta-based ISS two years ago because of the hassles and cost involved in maintaining the system internally, Hilliard said.

Cost Factor

Cost is also important, said Vijay Bobba, a partner at The McKenna Group in Mountain View, Calif. The technology consulting firm recently outsourced firewall management to Denver-based OneSecure for less than a quarter of the $100,000 it would have cost to hire a full-time security professional, Bobba said. As a result, McKenna is now looking at outsourcing all remote-access-related security issues as well.

"It's not just the price but the whole value proposition that needs to be looked at," Bobba said. For instance, by outsourcing to OneSecure, McKenna has 24-hour protection that wouldn't have been available otherwise, Bobba said.

ISS's firewall monitoring service starts at approximately $300 per month and goes to more than $1,000 per month, while its intrusion-detection services range from $800 to more than $3,000.

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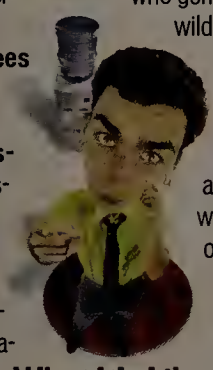

What It's Like To Work at...

Interviewee: Patty Khalifa, acting senior director of IT
Company: National Wildlife Federation, a nonprofit conservation organization
Main location: Reston, Va., plus 11 field offices nationwide
Number of IT employees: 18 in Reston, plus five at a catalog sales fulfillment center in Winchester, Va. The majority of the staff provides end-user technical support.
Number of employees (end users): 633 nationwide
Mission-critical systems: "The e-mail system [GroupWise, running on a Novell NetWare network], because we're a communication-intensive organization, both internally and externally.

"We have 11 field offices, and the goal is to share information because each one is working on similar projects, like restoring wetlands. But we're geographically challenged – we have to get out to where constituents are but still all be able to work together. The public Web site is also key to our communication efforts."
Major initiatives: "We've recently gone through some outsourcing and now outsource our contributor [membership/donation tracking] system.

"We're looking at IT projects that will directly support our conservation efforts and improve communications, so we're expanding our telecommuting abilities, getting into document management and getting more into Web-based activities. . . . We've also implemented a document archiving system and are scanning all of our personnel files in [human resources].

"We'll also be upgrading our hardware out in the field to support distance learning – internally for things like IT training, and externally for educational outreach."
IT training: "Probably Web technologies and some training in the new financial system."
Bonus programs: An annual bonus program rewards selected employees for exemplary performance throughout the year. A short-term incentive plan offers cash awards of as much as $500 for smaller projects.
Compensation: "All nonprofits pay a little less than the commercial sector, but our HR department does a tremendous job of keeping up with the market."
Perks: "You work with people who genuinely care about wildlife and the environment. We're encouraged to volunteer to participate in educational activities, like the annual Family Summit, which is held in a state or national park.

"Leadership understands the balance between work and life, and I think that's important."
Workday: "We have coverage from 7 a.m. to 6 p.m. But we usually work an eight-hour day within that."
Dress code: Business casual
Kind of offices: "We just moved into a new building [on Feb. 5] that we built, and we've gone to an open-cube environment for everyone, including the president, to foster collaboration.

"We chose a site that backs up to a county park with nature trails, and it's close to a major bike path that connects with other bike paths in the Washington metro area, so we can encourage people to bike to work – there are bike racks and solar-heated showers.

"We have a fitness center on-site, and the parking lot has bioretention ponds so that when it rains, water collects in the ponds and is cleaner when it leaves the property."
Percentage of staff that telecommutes on a given day: "It's hard for IT to telecommute because such a large percentage of the staff does tech support, and you need to be here. But we can dial in from home when there's a problem after hours."
Would employees feel comfortable e-mailing the president and CEO, Mark Van Putten? Yes.

– Leslie Goff (lgoff@ix.netcom.com)

JIM CHAMPY

New Infrastructure

DURING THE PAST SEVERAL DECADES, many companies have spent hundreds of millions, if not billions, of dollars to build their IT infrastructures. But in spite of all this investment, the infrastructures of most companies aren't ready for the Digital Age.

The Internet has made this blatantly obvious. At its most basic, the Internet is an external network capable of connecting all the computing devices in the world and accessing all the power and data they contain. Potentially, it's the tool that will bring massive efficiency improvements in transactions between companies.

Businesses spend $2 trillion annually on logistics — moving goods from one place to another. Forty percent of those dollars are spent on the administrative processes between shippers and receivers — mostly paperwork: as many as 26 documents for a transcontinental shipment. Imagine if the efficiency of those processes could be improved 50% by redesigning processes that cross organizational lines. Thanks to the Internet, that's clearly possible. Business would save $400 billion. Not a bad savings. But few companies are ready to realize their share of this potential.

That's because the IT infrastructures of most companies remain fragmented. They're made up of mostly noncommunicating devices, multiple networks and applications that represent antiquated business processes.

The massive spending on Y2k readiness and the last generation of ERP systems didn't go far enough in preparing companies to do business in fundamentally new ways. Companies need new processes and a new IT infrastructure to operate in the digital world.

The question now is: Who's going to pay? It's very difficult to convince executives who run businesses that they should spend on infrastructure to support some future promise. No one would spend money on the foundation of a house if they didn't know what was being built on top.

Making the case for spending on IT infrastructure has always been challenging. That's especially true today. The collapse of the dotcoms, after all the hubris that accompanied their rise, has some managers believing that the payoff in electronic commerce is years away, maybe a decade. And with the current business slowdown, capital budgets are tightening.

IT infrastructures at most companies remain fragmented.

The case for investing heavily in your company's IT infrastructure will have to be made in a compelling way. You must know something about what you're going to build. It won't suffice to say that the thousands of people in your company need to communicate and that you need to move more information among you, your customers and your suppliers. That's certainly true. But what real business benefit will you produce: faster growth, lower costs, higher quality, better service, more product variety, a higher level of innovation? Business executives will increasingly be saying, "Show me the money," not just "Show me the bills."

This isn't just a job for the IT manager. It also requires business managers to rethink the business proposition they make to their customers, given what IT now enables. How can products and services be offered faster, better and cheaper? It will then require a close reappraisal of not just your company's processes, but also the processes that directly engage your customers and suppliers. In a way, it's a supercharged version of re-engineering.

How do you get business managers to search for opportunities that will pay for a new technology infrastructure? One way is to demonstrate the extraordinary savings available if companies really change the way they operate, such as in logistics. A better way is to find a senior executive in your company who shares your vision of how, given a new technology and process infrastructure, the business could grow aggressively.

You may see either approach as a challenge. But ironically, today's weakening economy may actually be working *for* you. When times are good, it's difficult to convince business managers to change. When the economy slows, pressure increases to do something new. ◗

Champy is chairman of consulting at Perot Systems Corp. in Cambridge, Mass. He can be reached at JimChampy@ps.net.

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Where Rite Aid WENT WRONG

Computerized distribution snafus and charges of software-based consumer fraud have contributed to the pharmacy chain's bottom-line ills. By Kim S. Nash

CHRIS HARTLOVE

WHEN RITE AID decided to purchase Drugstore.com and dumped plans to create its own Internet storefront, some employees became disillusioned, says CIO Don Davis.

MULTIMILLION-DOLLAR losses, allegations of software-based consumer fraud, computer problems at an advanced distribution center and a new CIO have put the IT group at Rite Aid Corp. through the wringer during the past two years.

Once known as innovative IT practitioners, the 500 members of Rite Aid's IT staff are now more cautious and money-conscious than ever. "They were past leading-edge," says Loren Foster, a project leader and systems engineer at Rite Aid from 1987 to 1996.

"We loved it. You got to play with all the new toys," says Foster, now an independent contractor. But these days, he says, "they don't have the luxury to experiment."

For example, Camp Hill, Pa.-based Rite Aid in 1994 became one of the first pharmacy chains to use a nationwide satellite network, which allowed its customers to walk into any Rite Aid store in the U.S. and get prescriptions filled or refilled on the spot.

But having lost $1.1 billion in fiscal 2000 and $461.5 million the year before, Rite Aid is no longer a high-tech playground.

Several factors triggered the red ink, including unfavorable real estate deals, overenthusiastic store expansion plans and questionable accounting practices that were investigated by the Securities and Exchange Commission. These problems forced the company to restate its financial results last August for 1998 and 1999.

Then, IT missteps, such as computer problems at an advanced distribution center, made matters worse.

With $14.7 billion in sales for fiscal 2000, Rite Aid is still one of the world's biggest pharmacy chains. But now it's more prudent about its IT spending, says Don Davis, who was named CIO last February as part of an executive shakeup to address Rite Aid's financial troubles.

Previously, Davis was vice president of application delivery at home improvement chain Lowe's Companies Inc. in North Wilkesboro, N.C. Before working at Lowe's, he managed IT outsourcing at Thrifty PayLess Inc., a Wilsonville, Ore.-based pharmacy chain.

Davis says he came to Rite Aid for the personal challenge. "I've done just about everything I can in retail except be involved in a turnaround situation, which is what this is," he says.

"In the past, the company took more liberty [with IT spending]. We're more cautious about that now," Davis says, acknowledging that Rite Aid has seen an undisclosed number of IT people quit as a result.

For example, before Davis took over IT, Rite Aid had staffed up for a major e-commerce drive. It planned to launch an Internet storefront in 1999 to sell and refill prescriptions online. But then the company decided that buying 25% of Drugstore.com Inc. would be less expensive and more lucrative.

After a 10-year, $7.6 million deal with Drugstore.com was announced in June 1999, "the people associated with the old plan were disillusioned," Davis says. (Rite Aid's stake in Drugstore.com was diluted to 15% after the Internet company's initial public offering in July 1999.)

He declines to cite turnover rates in the company's IT department or specify the size of its IT budget.

Several telephone calls to Kent Whiting, former senior vice president of information systems at Rite Aid, went unanswered.

Still, Rite Aid must be careful not to cut IT spending — and experimentation — too deeply, says Paul R. Brown, chairman of the accounting department at New York University's Stern School of Business.

The use of IT in product and inventory management is central to pharmacies, Brown says. "Rite Aid is still struggling and in an industry that's highly, highly competitive," he says. IT strategy "is one of the last areas where I'd be shooting for no room for error."

Righting Wrongs

In response to its huge losses, Rite Aid has said it expects to spend more than $94 million to reassess and restate its financial results for 1998 and 1999. That includes rerunning mainframe-based accounting systems and paying IT people overtime to work with internal and external accountants and auditors during the process.

Still, Rite Aid doesn't plan to replace its combination homegrown/Geac Computer Corp. accounting system, though Davis had expected to do that when he took the job. "The basic capabilities are OK," he says.

Instead, Davis says he plans to build a new decision-support application to refine financial reports that flow through the accounting department. It will be a combination of an as-yet unselected package and internally built software.

One of the risks Rite Aid faces in spending less freely on IT is falling behind key rivals Walgreen Co. and CVS Corp., says Mark Husson, an analyst at Merrill Lynch & Co. in New York.

> I've done just about everything I can in retail except be involved in a turnaround situation, which is what this is.
>
> DON DAVIS, CIO, RITE AID

A shortage of pharmacists in the U.S. has spurred both of those companies to try to automate pharmacy operations as much as possible and to cut the number of hours pharmacists are needed, Husson says.

If Rite Aid can't keep up, "then there is a big cost pressure from the increased need for pharmacists' hours, and a lesser chance of finding pharmacists who want to work there," he says.

In addition, Rite Aid has spent several months fending off a handful of lawsuits accusing the company of tweaking software at its stores to overcharge some customers.

Rite Aid's cash register software was automatically cross-referencing pricing and pharmacy records to add $1 or more to the price of prescriptions for people without health insurance. Insured customers, meanwhile, weren't being charged extra.

Several states investigated the practice, with Florida eventually suing Rite Aid in 1999. That suit was recently dismissed. New York negotiated a deal in which Rite Aid agreed not to charge uninsured people more money. Last August, the company settled a similar suit in Pennsylvania for undisclosed terms.

The company declines to talk about the policy, except to say that it no longer overcharges uninsured customers. IT staffers were dispatched to Rite Aid's 3,800 stores to disable the homegrown point-of-sale code.

Then, in early 1999, Rite Aid suffered unexpected software problems at a new state-of-the-art distribution center in Perryman, Md. Inventory counts were routinely incorrect, and automated warehouse stocking machines misplaced products.

The glitches delayed the opening of the new warehouse while internal IT and logistics people worked on fixes. Meanwhile, an old center in Pennsylvania had to stay open for an extra five months. All of that meant that profit margins on Rite Aid's products shrank — from 26% in fiscal 1998 to 23% in fiscal 2000.

Most Wall Street analysts who follow Rite Aid rate its stock a Hold and say they're cautious about when and if the company will pull itself out of its financial pit.

Meanwhile, Rite Aid's troubles may provide an opening for competing pharmacy chains. "You pay close attention to what's happening to your neighbors and whether you can leapfrog ahead when you know the other guy is tied down at the moment," says the CIO of a competing chain who requested anonymity.

Yet despite the turbulence at Rite Aid, the company will eventually be an IT leader again, predicts Steve Shaha, an analyst at Gartner Group Inc. in Stamford, Conn.

Rite Aid replaced its CEO, chief financial officer, president and other senior executives a year ago, and it's natural for new management to stop or slow down large IT projects while assessing a company's larger needs, Shaha says. "But there are few competitors in retail pharmacy that could be classified as being more progressive and more enlightened in IT," he adds.

AMERICA'S MOST WAN

They are the technologists that every recruiter is gunning for. From Web developers to security analysts to e-commerce developers, here's a look at the top jobs for 2001. By David S. Bernstein

PATRICK MATUS HAS 10 phone numbers that he always keeps at his fingertips. These are for the staffing firms he uses to help find talent for the 900-plus-employee IT department at Freddie Mac in McLean, Va.

Some of those recruiters get him the generalists he needs. Others have expertise in finding IT professionals with certain specialties that Matus frequently needs. If you do the hiring for a large IT department, you need an army of help these days.

Today, Matus has his army out looking for several types of workers: network engineers to help put together and maintain his new Cisco routers; data security analysts to implement and test network security measures; Unix system administrators to fill vacancies from normal turnover; developers to move legacy systems onto the Web; and Sybase administrators, because his is strictly a Sybase shop.

Matus happens to be looking for the same people as many other organizations, and for the same reasons: turnover, new projects, expanding networks and development of new applications. Although every company has some specific needs, certain job titles crop up everywhere.

To find out which jobs will be the hottest this year — by sheer numbers of new hires, not necessarily by salary — we went to several national recruiters and staffing firms for their observations and predictions. The result is the following top 10 list for 2001.

① WEB DEVELOPER

In nearly unanimous agreement, recruiters and staffers say that Web developers have quickly surpassed all other job titles in sheer demand. Companies need not just one person but whole teams of Java-experienced developers to design and build the endlessly increasing applications for the Internet.

"Everybody needs 'em. Nobody wants to try to recruit 'em," says Jeannie Jones, president of IT Search Professionals Inc., a national recruiting firm in Cape Coral, Fla.

"Everything I use to manage is a Web-based application," says George Demetriou, who manages contractors nationally for WorldCom Inc. He does his performance appraisals, processes travel expenses and almost everything else via the Web. "And most of those applications we use you cannot just buy off the shelf and use it — we either have to develop it in-house or buy it and modify it and maintain it," he says.

That means there's lots of demand for developers. "There is the whole Java and e-business area, but mainly, it's the old systems, [with businesses] looking for creative ways to Web-

MANUELLO PAGANELLI

LIKE OTHER EMPLOYERS, Patrick Matus at Freddie Mac is on the lookout for employees to fill a number of positions.

S 10 TED

enable them," says Matus.

That also means that Matus is looking for someone who not only knows the Java language but who can also translate mainframe applications to the Web. That calls for someone who can think creatively, program pragmatically and understand what the Web can add to older programs.

2 DATABASE ADMINISTRATOR

"It's not that it's a hot one," Mark Krusinski at Emerald Resource Group Inc. in Broadview Heights, Ohio, says about database administrators (DBA). "It remains constant. It's not weakening."

DBAs — particularly for Oracle — can always get a job, according to recruiters. The demand for Oracle administrators is highest, but Microsoft Corp.'s SQL Server is growing, even at high-transaction firms that should be Oracle Corp.'s bread and butter. And every recruiter seems to have some base of clients that use Sybase, Informix or DB2. And watch out for IBM's new product later this year.

The bottom line is that no company subtracts DBAs; they only add more, gradually, as their departments grow.

"There's actually more need for that than ever before because the rest of the organization is screaming for that data," says Jones. She points out that DBAs sometimes become necessary in new data architecture or warehousing projects.

3 SECURITY ANALYST

This wouldn't even have been on the list a year ago, but suddenly, every technical recruiter is finding a stack of these openings on his desk. Someone has to handle all those firewall issues, access-control lists, router configurations, virtual private network setups, system penetration analysis and the various other nuts and bolts of securing networks.

Recruiters say the need for people with technical security know-how, rather than strategic planning expertise, is huge and growing. The need for security analysts has exploded at financial firms and large manufacturers and has also moved quickly into midsize companies — and, of course, the dot-coms, which have everything riding on security.

"I've talked to the CIOs and directors of the clients we work with and asked them who does their security," says Jim Constable, president of Staffing Partners Inc. in Shelton, Conn. "It's been the network administrator, but now they're creating new [security-specific] positions that pay less." They fill those positions with less-experienced people, Constable says, and treat them as lower-responsibility jobs than administrator posts.

4 UNIX ADMINISTRATOR

Although none of the recruiters ranked Unix administrators as their top priority, the position ranked high on everybody's want list.

"Unix administrators are very much in demand nationally," says David Meyer at CDI Corp., a recruiting firm in Philadelphia. The explosion of Web servers has helped drive the need for people to fill this job title.

Krusinski says that as the number of servers has grown at organizations, a hierarchy of administrators has become necessary. "In a large, complex Unix environment with 50 servers or more, you might find a lead Unix person making $120,000," he says.

So an understanding of complex internetworking — and managerial skills — will increasingly find a place to be rewarded; at the same time, this hierarchy will allow less-experienced people to jump into junior Unix administrator positions, perhaps fresh out of school.

5 E-COMMERCE APPLICATION DEVELOPER

This is another job that has changed overnight from tiny niche to mainstream need. "There's an onslaught of e-commerce application development," says Constable.

"The Java demand is starting to drop off," says Meyer, who placed this job title first on his list. "Whereas the middle of last year, the Java demand was highest, e-commerce developers picked up later in the year."

Companies are "getting back to the basics of these projects on the Internet," Meyer adds. "The honemoon is over." Companies can no longer mess around, testing fun looks and designs in the name of Web presence.

Manufacturing and financial institutions in particular are looking for developers with business-to-business application experience.

"There's a big difference between that and setting up e-commerce with customers in their homes," Meyer says. "When you're talking about e-commerce between large commercial enterprises, a lot of dollars can be lost in that transaction."

6 C++/OBJECT-ORIENTED/ VISUAL BASIC DEVELOPER

Midlevel developers are in huge demand, according to recruiters. Visual Basic remains a standard, object-oriented design is everywhere, and C++ remains the language of choice. Visual Basic work is in huge demand, according to Doug O'Neil, president of The Huntington Group in Memphis.

This demand primarily comes from the huge number of projects out there, as everyone is trying to automate every function of their businesses, from the front end of customer marketing to the back-end financials and supplier control.

In fact, 12 months ago the position of midlevel developer might have been No. 1. Unfortunately for employees in this area, the slowing economy seems to be making companies more wary of maintaining large teams of developers.

"The excessiveness of 2000 is over," says Meyer. "They are better off hiring one very good developer than two so-so ones."

If pessimism about corporate profits proves unfounded, expect demand in this category to shoot straight up by next year.

7 JAVA PROGRAMMER

As mentioned earlier, the need for Java professionals may have peaked about six months ago. But just because it isn't rising, that doesn't mean it has dropped off the list. Far from it — the position has settled in as a steady, large need. O'Neil still has it in his top three. Demetriou lists it as No. 1 at WorldCom.

"We always need those," Matus says.

Programmers generally still need basic language skills and that precious combination of speedy coding with few mistakes. But if IT departments do start having to do more with fewer people as the result of downsizing, additional development skills and other languages will prove more important.

8 NETWORK ENGINEER

Here's another job that's only going to keep growing — steadily, but not spectacularly. "It's still a lot of numbers," says Jones.

The good news for aspiring network engineers is that nobody questions the basic direction in which the job market is headed: It's all Cisco Systems Inc., as far as the eye can see.

"We just bought all new Cisco routers," says Matus. "Data architecture, IP experience, certified network engineers, [Cisco Certified Internetwork Experts] — that's in the crystal ball for this year."

As companies large and small continue to invest in networking technologies to make their networks faster, more efficient and less costly, engineers will continue to be in demand, recruiters say. Wireless technologies in particular will create plenty of jobs for those who are ready for that wave.

In addition, large companies are increasingly considering private networks to replace dial-in and Internet connections, for security and long-term cost advantages. Creating and maintaining those networks is a long-term commitment that will require network engineers.

9 PC TECHNICAL SUPPORT

"PC techs are always in demand. They will always be in demand," says Meyer.

Any thought that personal digital assistants and wireless Internet and computer appliances will create a PC-less office is a distant dream. So, too, is any notion that PCs and their software will soon run in flawless harmony and never break down, or that end users will soon be savvy enough to solve most of their own problems.

Although he acknowledges that the raw numbers remain high, Krusinski says he has actually seen a decline in demand for these professionals. "Companies are outsourcing that as fast as they can," he says.

This observation holds for help desk staff as well. Outsourcers can usually consolidate several clients' jobs into fewer positions than the various companies would require separately, so the trend ultimately means fewer total job openings. In addition, many people start in PC support to get a foot in the door of an IT department, so working for an outsourcer may hold less appeal.

10 QUALITY ASSURANCE TESTER

None of the recruiters we polled listed this as their most-pressing need, but everybody mentioned it as a big area of demand.

"There's actually more demand for testers than security people," says Meyer. "It's just easier to fill the jobs, because there are more testers than security people available."

Nowadays, it's not uncommon for companies to create year-round testing departments, which means more full-time jobs and less contractor work. WorldCom, for example, is looking to bring that function in-house, says Demetriou.

Some other jobs that were mentioned but didn't make the top 10: help desk; supply-chain management and customer relationship management system developers; project managers; data architects; and change management specialists. ◗

Bernstein is a freelance writer in Medford, Mass.

Make Your Own Luck

SCHUCKENBROCK: "You make your own opportunities." DANNY TURNER

WHO IS HE?

Steve Schuckenbrock, 40, is the chief operating officer of The Feld Group Consulting, a Dallas-based technology management consulting firm.

Call it dumb luck. Like Peter Sellers in Being There, *incredible opportunities just land in some people's laps because they happen to be in the right place at the right time. Right?*

Not quite, says **Steve Schuckenbrock,** *chief operating officer at The Feld Group Consulting, who, at the age of 40, is considered one of the giants of IT. Yes, opportunities are plentiful in IT, but by putting time, energy and commitment into your work, you won't have to seek out career breaks. Your colleagues will recognize your talent and present you with opportunities to move ahead, he says.*

Schuckenbrock has had a whirlwind of a career. He started as a salesman at IBM, where he worked on accounts for the city of Dallas and Plano, Texas-based Frito-Lay Inc. He served as executive assistant to division president Lee Reiswig during the battles over Microsoft Corp.'s Windows and IBM's OS/2, and he ran the transportation industry accounts for Frito-Lay.

In 1993, he joined The Feld Group when Charlie Feld, the CIO at Frito-Lay during Schuckenbrock's consulting days there, was first getting the company off the ground.

A few years later, Schuckenbrock went to work at Frito-Lay to help overhaul its systems. After three years there, Roger Enrico, then-chairman and CEO of Purchase, N.Y.-based PepsiCo Inc. (Frito-Lay's parent company), offered Schuckenbrock an opportunity that brought him international notoriety: Enrico asked Schuckenbrock to consolidate all of the company's IT — including Pepsi's and Frito-Lay's — into one worldwide organization, a project Schuckenbrock led from 1998 until last summer. When he was done, he went "back home" to The Feld Group in Dallas.

In a recent interview with Computerworld's **Melissa Solomon,** *Schuckenbrock reflected on his experiences and offered advice about how IT professionals can take advantage of opportunities.*

What do you consider the first big break in your career? There are lots of opportunities, and I'm a strong believer in two things: One is that you make your own opportunities; two is that you're not in constant hunt for the next one. You basically go immerse yourself in the job that you're in, and it creates opportunities for you.

I've had the great fortune of having lots of opportunities. You go back to the first job at IBM — that was a huge break. I was new out of college. . . . When they gave me the city of Dallas [account], the city hadn't bought a stick of IBM equipment in 15 years. And I just put 100% of my energy into it [and convinced the city manager] to put out a bid to replace everything in their data center and all of their networks with IBM equipment. I was rookie of the year at IBM.

Frito-Lay was always considered one of the premier IBM accounts. So in my second year, they gave me Frito-Lay and said run the account, run the account team — there were 17, 18 people on the team. I was 23, 24 — something like that.

So landing the Frito-Lay account was a big break for you. Looking back, how did it help you grow in your career? PepsiCo has very talented leaders. That was back in the era of Wayne Calloway and of Mike Jordan and of Bob Beebe. They held court . . . and it was a very fast-paced, dynamic business. . . . So I really learned a lot about how dynamic a company can be, and through [then-Frito-Lay CIO] Charlie [Feld], I had an opportunity to see real functional leadership where he was leading an IT organization to do great things.

Charlie really taught me how to take a five- to 10-year perspective on things, as opposed to a one-year perspective. So don't look at your quota and say, "Boy, I've got to make that number." Look at that relationship over a long period of time. And know that if you do the right thing at every opportunity for the company that you support, that you'll win nine out of 10.

In order to be successful, I needed to understand what the senior VPs at Frito-Lay understood, whether they were in sales or manufacturing or IT.

What advice would you give IT professionals in terms of creating their own opportunities? Learn as much as you can early, so get a lot of breadth. Certainly, you have to have technical skills, that's taken for granted. But to learn how the budgets work, to understand how they influence people. . . . If people take that lightly and are looking just for the technical work, they are completely limiting their opportunities.

Is it OK to ask for help from others? Yeah, it certainly is OK to ask for help, and I think the concepts of mentoring and having an adviser to help you understand when to be patient and when not to be is a good thing for an IT professional to have.

The ideal is when a company has invested and taken the time to provide both a performance plan and feedback on your performance.

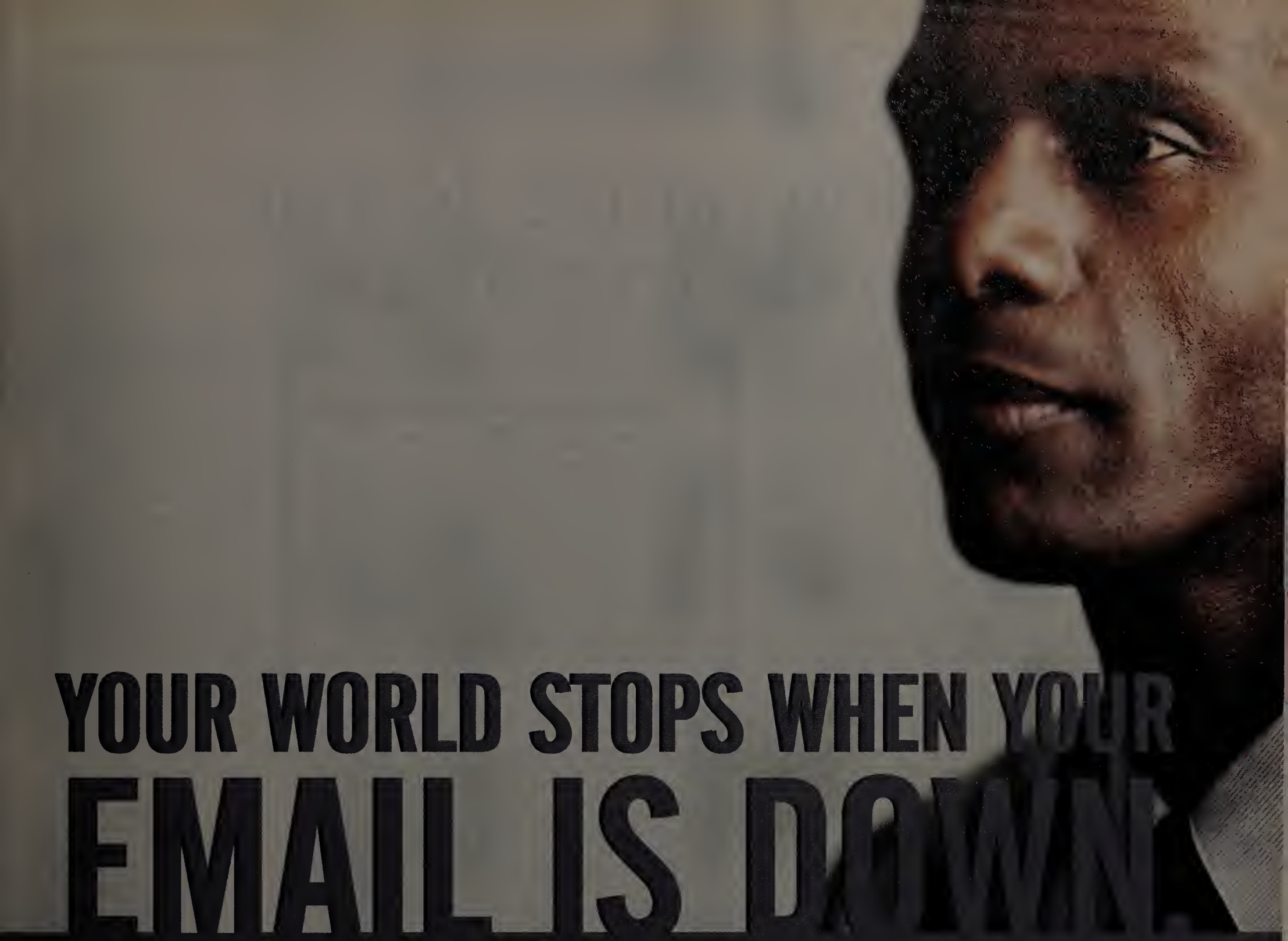
How important are contacts? I think finding people who model the behavior that you would like and learning from those people is critical . . . as opposed to the contact list you've got in the Rolodex, and because you've had lunch with them one day, they're your friend.

Has there been anyone who has had a major effect on your career? Basically, you wind up working with people you like to work with. Charlie and I have had a good working relationship for a long time. . . . So when Charlie asked me to leave IBM and come start up the company with him, it was a great opportunity.

What skills should IT leaders seek to develop? IT continues to starve for great leaders, and leaders are the people who show up with all of the business-perspective, people-leadership skills. They're able to motivate and lead a room, are real savvy around the business and the budgets and the dynamics of how you run a function. They have a real commitment to character and the values inside of an organization that allow it to be sustainable through the long haul.

Look at what it takes to be a great leader in an IT organization and build those skills, really focus on the skill development in those areas.

Any words of caution for people looking to advance in their careers? The superficial, looking for the next thing that's going to be good for you is not a great way to develop a career. You see that too often. People say, "Well, I really ought to be doing this and that," and they don't finish what they're doing. The best way to be successful is through a series of successes as opposed to a series of jobs. . . . It's just a superficial or artificial advancement. It's very shallow and it doesn't last long. Those careers fall as fast as they rise. ◗



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Maintenance, Repair And Operations

BY MARY K. PRATT

THE AVERAGE businessman might hear *MRO* used by office managers, purchasing agents or even CEOs. They might see it on financial reports or hear it in budget meetings.

Still, many people don't know what the acronym means. It stands for maintenance, repair and operating/operations, which are the purchases a company needs to make to keep its operations running smoothly. Although the term isn't commonly used in most business circles, MRO items have a tremendous impact on a company's efficiency and bottom line.

"It's very crucial to have the right inventory levels and to procure items efficiently" to hold down a company's operational costs, says Walt Vanderlaan, vice president of strategy at MRO Software in Bedford, Mass.

Manufacturers have two basic types of purchases: direct and indirect materials. Direct materials (also called direct spend) are the items that go into the product the manufacturer sells. An automaker would put a seat's upholstery in this category.

By comparison, indirect materials are "all the things you use to essentially operate your business," says George Rimnac, vice president and chief technologist at W. W. Grainger Inc. in Lake Forest, Ill. "MROs are a portion of those indirect materials."

MRO items include everything from replacement parts for machinery to safety products for workers and cleaning products for the physical plant.

"Many of the products we sell are products our customers didn't know they needed until today," Rimnac says.

For example, a customer might need to replace a 15-year-old pump that broke unexpectedly. The customer might be surprised to learn that he also needs safety goggles, gloves and special tools to install it. All of these examples are MRO items. Some companies also classify items such as paper clips and staples as MRO products, although others say those items are usually covered by their office supply budgets.

In any event, MRO encompasses a tremendous variety of items. Grainger, with $5 billion in sales of MRO-related products and related information last year, lists 220,000 items at its Web site, including floor scrubbers and paper towel dispensers.

Managing MRO

MRO items might seem pretty mundane. After all, how crucial are fluorescent light bulbs? But proper management of MRO inventory can save a company tens, even hundreds of thousands of dollars, while poor management of such inventory can create waste and tie up capital. Manufacturers are well aware of this, industry experts say, and are adopting MRO software to track inventory, schedule maintenance and list procurements, making MRO oversight more efficient.

"To some degree, it's hard to estimate the demand for MROs," says Norbert Ore, vice president of purchasing at Chesapeake Display & Packaging in Winston-Salem, N.C., and chairman of the Manufacturing Business Survey Committee at the National Association of Purchasing Management in Tempe, Ariz.

For example, a manufacturer might turn over its inventory of direct materials 12 to 18 times per year, but turning over MRO inventory just four times annually is considered good, says Ore. Unfortunately, he says, manufacturers don't always do a good job of tracking their MRO inventory.

"We're dealing with supply chains and processes established after World War II," says Mike Jacobs, founder and CEO of IndustrialDNA Inc. in West Sacramento, Calif. "The processes that people use haven't changed much since the late '40s, early '50s."

DEFINITION

Maintenance, repair and operating/operations (MRO) items are the products a company uses to keep its business in good working order. MRO items, such as cleaning fluids or replacement parts for machinery, do not end up in the manufacture of the company's final product.

BLIND SPOTS in an MRO supply chain can cause inefficiencies in predicting market demand and fulfilling spot-buying needs, says IndustrialDNA CIO Ken Munson (right), pictured with CEO Mike Jacobs.

'Blind Spots'

Many companies have computerized their inventories for added efficiency. However, few organizations actually use their computers to link up with suppliers. "That's where those blind spots come in," Jacobs says. "People are working in these little fiefdoms that are companies."

As a result, products often sit on shelves for years. Money spent on that unused inventory could have been better spent on a company's more immediate needs, experts say.

"Blind spots cause inefficiencies from predicting market demand to fulfilling spot-buy requirements," says Ken Munson, CIO and vice president of business development at IndustrialDNA, which bills itself as a Web-based trading hub for suppliers and distributors. "The lack of visibility creates redundancy or excesses in the supply chain."

Rimnac puts MRO items into two categories: "just-in-time" and "just-in-case" inventory.

Fluorescent light bulbs fall into the first category; companies don't need to stock up on those items. Stocking up on unneeded items can be expensive because it ties up capital that could have been used elsewhere. Plus, items can become lost, damaged or even obsolete while waiting to be used.

That means a company pays twice: once for the unused item and again for the item when it's needed.

"You don't want to have a lot of stuff on your shelf without a lot of turns," says Larry Peterson, president of Midwest Fluid Power Co., an industrial distributor of fluid power components and systems in Toledo, Ohio.

By contrast, a special bearing that's essential to running equipment and takes weeks to replace falls into Rimnac's just-in-case category, and a manufacturer should keep such spares on hand to prevent a costly production shutdown.

For example, if part of the robot used on an automotive assembly line breaks down, the plant would be idled.

"When I don't have that bearing and that machine is down, I'm affecting the operation of that plant," says Vanderlaan. A shutdown could affect dozens of people's jobs and cost a company thousands, sometimes millions of dollars in lost business.

MRO Software is one of several vendors that produces programs that help companies manage their MRO needs, from scheduling preventative maintenance work to tracking work orders. The software is Web-enabled, so a company can coordinate its needs directly with its distributors.

But integrated software isn't the industry norm, Ore said.

Still, "computerized inventory has helped tremendously," he adds. Ore says studies have shown that companies can knock 10% to 30% off their annual MRO costs by using computers to manage inventories. ◗

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■ *Are there business terms you would like to learn about in QuickStudy? Please send your ideas to quickstudy@computerworld.com.*

JOE AUER/DRIVING THE DEAL

If a Vendor Offers the 'Lunch' Ploy, Don't Bite

VENDORS ARE NOTORIOUS for adeptly using ploys to gain an advantage over the competition — and over us, the customers. Our challenge is to recognize these ploys and counter them with appropriate tactics. Savvy vendors are constantly inventing new ploys as they size up each situation and try to master the customer.

"Account control" is the essence of a vendor's most successful sales strategies. The customer must never lose sight of the fact that even in the most ideal world of ethical business, salespeople are motivated totally by their compensation plans, which offer incentives to maximize their firms' profits and minimize risks in any deal.

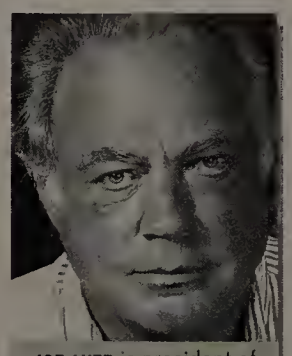
An experienced veteran of negotiations once wryly commented that when a vendor does something highly effective in negotiations, it's called a "ploy." When a customer does the same thing, it's called a "tactic." Let's look at what happened recently when a ploy met a tactic:

As part of a disciplined procurement process, a customer included a "bidders' conference," which was scheduled to be held two weeks after the request for proposals (RFP) was issued to potential vendors. This gave the vendors two weeks to digest the RFP and develop questions in preparation for the conference.

The customer requested that the vendors submit questions via e-mail three days before the conference. This approach allowed the customer to review all the questions and prepare sufficiently detailed answers. The customer also informed the vendors that they'd be allowed to ask additional questions during the conference. The conference was scheduled to last three hours, ending at noon, with most of the time devoted to vendor questions.

As expected, representatives of several vendors called the customer project manager (identified in the RFP as the single point of contact) and offered to buy lunch for the customer team right after the conference. This "let's do lunch" ploy included the usual reference to an opportunity to better understand requirements and tailor their responses. These vendors were trying to seize an opportunity to gain one-on-one access to the customer team and an advantage over the competition. Clearly, allowing a vendor such an opportunity would immediately cloud a customer's objectivity and "unlevel" the level playing field that the customer had worked so diligently to establish.

As we all know, there's no such thing as a free lunch. The vendors wanted additional information and the opportunity to build a relationship with the team outside the formal channel offered by the bidders' conference. They hoped to use the informal aspect of the relationship to gain further advantage during the remainder of the selection process. The price of a lunch could return a huge payback for the vendor that succeeded.



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The customer emphatically rejected the lunch offers, citing its commitment to objectivity and fairness. Additionally, the customer re-emphasized the need for the vendors to focus on satisfying the requirements in the RFP. This customer "tactic" was designed to send a clear message that unwanted advances outside the prescribed process would reflect unfavorably upon vendors that weren't process-obedient.

Customers that demand businesslike behavior and documentation are more likely to increase vendors' respect for them and build longer-term, more professional associations between the two organizations than they are to adversely affect relations with vendors. A customer's initial efforts to adopt a professional process may create an uncomfortable situation for both parties because the new system doesn't have the warm, fuzzy feel of a "partnership." But once the customer establishes that it intends to follow professional contracting principles in procurements, it will get more honest vendor representations and sales efforts, fewer manipulative vendor ploys and more realistic initial price concessions.

Also, an employee who doesn't use disciplined contracting and negotiating procedures could damage his career.

Sooner or later, it's likely to cause him considerable embarrassment or, even more seriously, cost him his job. In a nutshell, the astute customer will always have a tactic to counter any vendor ploy. ◗

BRIEFS

IBM, Lotus Help Make Arctic Connection

Members of the Arctic Blast 2001 dogsled expedition will use collaborative software and hosting technology from IBM, Lotus Development Corp. and St. Louis-based Connectria to engage in real-time chats with K-12 teachers and students. The two-person dogsled team will share its experiences with North American classrooms during a four-month, 2,500-mile trek.

E-business Software Vendors Join Forces

E-commerce software makers BEA Systems Inc. in San Jose and Austin, Texas-based Vignette Corp. have signed an agreement to create a global alliance and collaborate in engineering, sales and marketing, the companies announced last week. The goal of the alliance is to offer customers a complete e-commerce software platform, the companies said.

Flextime, Challenges Are Key to Retention

While many companies are cutting back on employee perks, the demand for IT workers is still so high that many employers are seeking creative ways to retain their top talent, according to the results of a survey recently released by New York-based PricewaterhouseCoopers' Unifi Network subsidiary. The top three IT retention strategies, according to the study, are flexible work schedules, challenging assignments and comprehensive training.

The survey of 144 companies in a range of industries also looked at recruiting strategies and found that employee referral bonuses are the most effective way to attract qualified staff. Meanwhile, the most-used method of recruiting staff – through newspapers and periodicals – is least effective, the study found.

B2C E-Commerce Up

Retail e-commerce sales for the fourth quarter reached $8.6 billion, an increase of 67.1% from the fourth quarter of 1999, according to figures released by the U.S. Department of Commerce. E-commerce sales for the fourth quarter accounted for 1% of all retail sales. Total e-commerce sales for last year were estimated at $25.8 billion.

Are We Too Casual?

More than one-third of executives polled by Cleveland-based search firm Management Recruiters International Inc. (MRI) said casual dress has gotten too casual.

"More than two years ago, we conducted a survey of hiring executives about the future of casual dress in the American workplace. Forty percent thought that the suit and tie would eventually vanish from the workplace," said Allen Salikof, president and CEO of MRI.

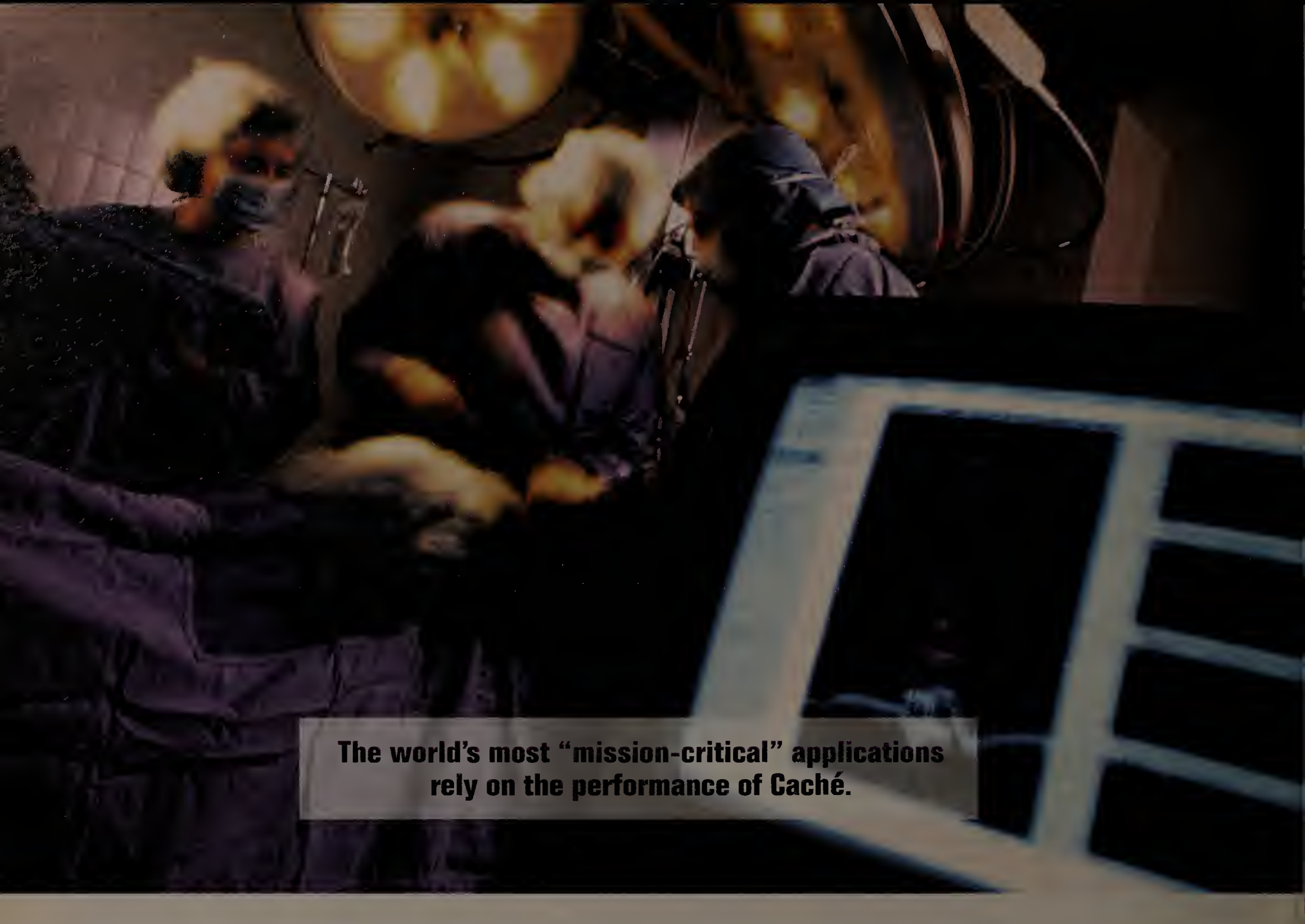
"But perhaps the pendulum has swung too far," Salikof said. "Attire such as open-toed shoes, tank tops and shorts or sweat suits should be considered too casual for the workplace. Yet more people are dressing in this manner at both start-up entities and Fortune 100 companies alike."

SNAPSHOT

Feeling Insecure

In a recent survey conducted by ExecuNet Inc., a Norwalk, Conn., firm that runs an executive career-management Web site, 62% of 947 executives polled said they're concerned about their job security. When asked about the causes of their concerns, the respondents cited the following among their top reasons:

25%	Possibility of a merger, downsizing or restructuring
24%	Company prospects aren't good
16%	Company culture/leadership isn't a good match
9%	Personal performance/limited advancement
9%	Poor industry prospects



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TECHNOLOGY

GLOBAL DILEMMA

Establishing Web sites with local content in multiple countries is one thing. Keeping sites current while routing customer requests and hooking into databases at headquarters is something else. Eastman Chemical solved the problem with software that tracks content changes in all versions of its site. ▸ 48

MOBILE TRADING

General Motors' OnStar division plans to add real-time stock trading and financial market data to its in-vehicle communications service. GM will team with Fidelity Investments to provide the service. ▸ 48

SECURITY JOURNAL

A hacker comes forward to identify a security vulnerability — and security manager Mathias Thurman gives him a job. Put your biases aside, says Thurman: Good security people are hard to find. ▸ 50

FUTURE WATCH

Organic light-emitting diodes are a self-luminous display technology that promises a brighter future for everything from cell phones and digital cameras to, eventually, laptop PC displays. ▸ 52

WINDOWS 2000 DEPLOYMENT

When FreeMarkets' online exchange business surged, its IT infrastructure ran out of gas. Can its new system, based on Windows 2000 Datacenter Server and SQL Server 2000, deliver the level of uptime and scalability required? This is the first installment in a deployment journal that will appear periodically in *Computerworld* this year. ▸ 56

QUICKSTUDY

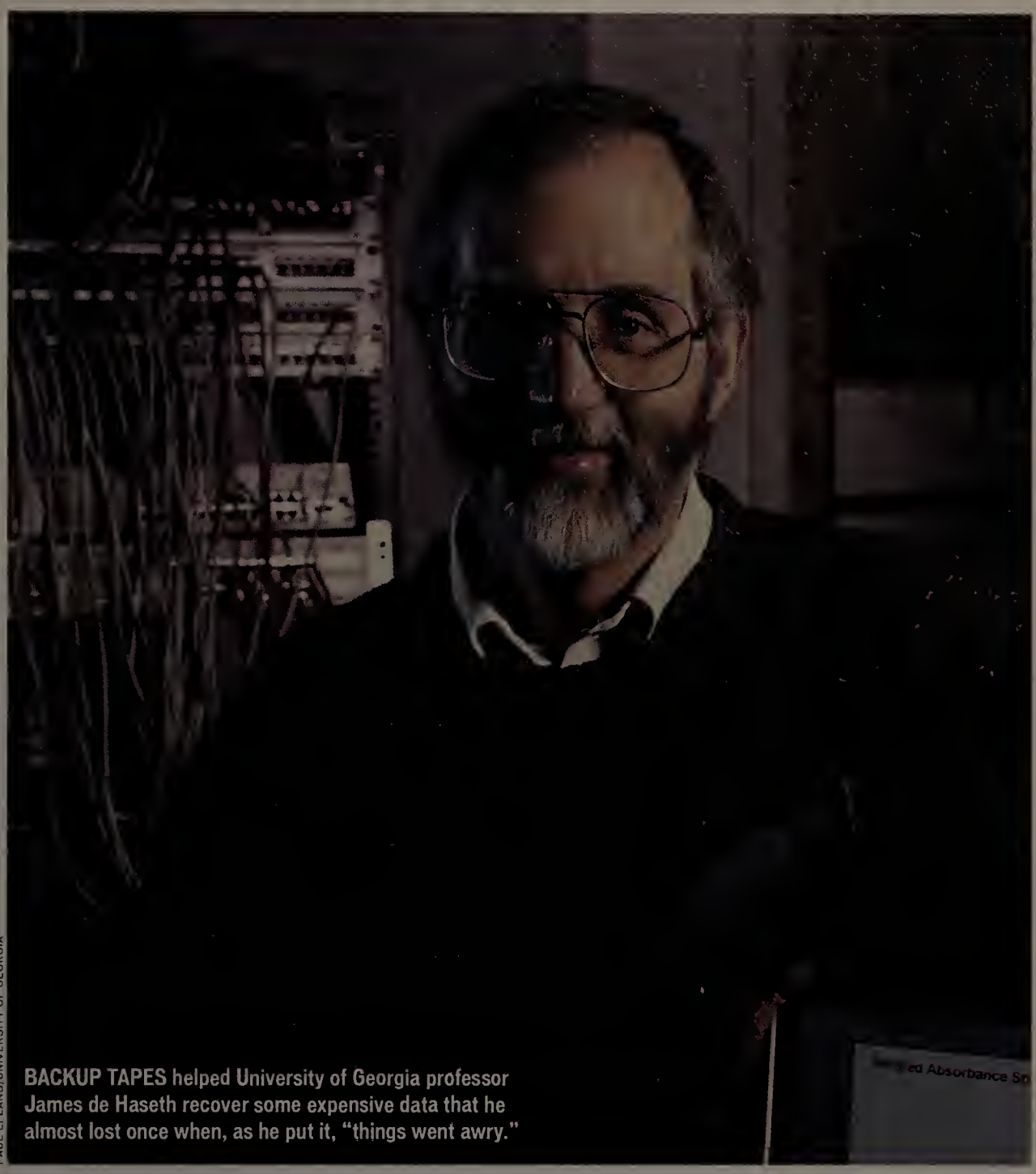
An uninterruptible power supply (UPS) is a device that provides electrical power with a constant, regulated voltage output when the main supply of electrical power is interrupted. UPS means never having to say you lost data during a blackout or brownout. ▸ 58

EMERGING COMPANIES

NativeMinds' support software uses a natural language interface to answer customer support questions over the Web. The company claims that its software can reduce the cost of help calls to less than half of what they cost when handled by humans. ▸ 60

SKILLS SCOPE

The vice president of information reporting at Health Risk Management relies on a team of IT professionals to successfully use business intelligence software to provide data to managed-care and insurance companies. The aim is to give users near-instantaneous access to new trends and let them make midcourse corrections regularly. ▸ 61



PAUL EFLAND/UNIVERSITY OF GEORGIA

BACKUP TAPES helped University of Georgia professor James de Haseth recover some expensive data that he almost lost once when, as he put it, "things went awry."

BACKUP BY THE TERABYTE

MODERN SCIENCE AND E-COMMERCE generate data on an unprecedented scale. Backup is more critical than ever — and magnetic tape is still the medium of choice. Tape technology is keeping pace as vendors continue to develop higher-performance, higher-capacity tape systems and new formats such as Super Digital Linear Tape, Advanced Intelligent Tape and Linear Tape Open.

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Firms Face Daunting Task in Keeping Global Web Presence

Key challenge is managing content, changes worldwide

BY JENNIFER DiSABATINO

ESTABLISHING WEB SITES for your firm in 30 countries, all with local content, is one thing. Keeping them current while routing customer requests to the right people in the right countries and linking all that information to databases in the home office is something else entirely. Just ask Toni Corwin.

Corwin is the Web globalization program manager at Eastman Chemical Co., a chemical supply firm in Kingsport, Tenn., with a Web presence that's 6,000 to 7,000 pages deep and localized for more than 30 countries.

Her challenges are to ensure that all content is kept up-to-date and that database information such as product catalogs can be transferred accurately to and from all of the Web sites. Not all content is appropriate for all sites, Corwin explained, and that's taken into consideration during the monitoring process. For example, some changes in content about products on the main site may be irrelevant to a Japanese site if Eastman doesn't sell a particular product in that country.

Corwin said that so far, there haven't been any instances in which content on one local site conflicted with that on another. "But we could see the writing on the wall," she said.

To keep content current on different sites in different languages, she chose WorldServer software from Idiom Technologies Inc. in Waltham, Mass. The software tracks content changes on each local Eastman Chemical site, alerts translators for the other sites that the change has been made and sets up a workflow program whereby the translation is automatically sent through a predetermined chain of command.

Though she has installed WorldServer for a beta test, Corwin must still resolve database compatibility problems, like the fact that Eastman's back-end systems can't accept Asian character sets.

Another problem with managing content is tracking customer input on one site through the entire customer relationship management system. One way to resolve that problem is to use machine translation software.

For example, Emeryville, Calif.-based Sybase Inc. now includes machine translation software from Transparent Language Inc. in its Enterprise Portal product line. Merrimack, N.H.-based Transparent Language. was recently acquired by U.K.-based SDL PLC.

Tim Fallen-Bailey, director of global products at Sybase, said the machine translation software is most useful for routing customer service questions to the right person in a given country. ◗

AT A GLANCE

Global Processes

Translating content for Web sites all over the world is an ongoing task. Some companies have found that keeping content up-to-date means doing the following:

- Having automated monitoring software alert translators when content changes on a related site in another language.
- Making sure back-end systems can accept data generated from your global Web sites.
- Making sure the appropriate customer service staffers get requests, especially when they're going through multiple localized sites.

GM's OnStar Puts Stock in Service

Teams with Fidelity for real-time financial data

BY LEE COPELAND GLADWIN

General Motors Corp.'s OnStar division earlier this month unveiled plans to add real-time trading and financial market data to its in-vehicle communications service.

Detroit-based GM is teaming with Boston-based Fidelity Investments for the new service, which will be available in two phases.

Using voice-activated commands, all OnStar subscribers will have access to computer-read stock quotes and market information as part of GM's nationwide Virtual Advisor launch in April, officials said. Access to individual Fidelity accounts for wireless stock trading, checking account balances and using other portfolio management features will be available only to Fidelity customers, starting late this summer.

"This is just the beginning for OnStar," said Jonathan Gaw, an analyst at IDC in Framingham, Mass. "They're trying to make OnStar a communications system that would bring you everything you would find in an automated telephone system, and they're implementing it in a hands-free environment."

A Growing User Base

The OnStar in-vehicle communications service combines Global Positioning System cellular technology and an around-the-clock service center. It was originally launched by OnStar in Cadillacs in 1996 as an emergency concierge and roadside assistance service.

Since then, the service has been augmented to include cellular calling and Virtual Advisor, a Web-based, voice-activated e-mail, news and Web content service. Virtual Advisor is currently available to subscribers in the northeastern U.S. and will roll out nationwide in April.

OnStar is available as a factory-installed option on 32 of GM's 54 vehicle lines. About 800,000 drivers subscribe at a cost of $199 or $399 per year, depending on the service level.

Japanese automakers Honda Motor Co. and Toyota Motor Corp. license GM's telematic (in-vehicle communications) service on their high-end vehicles.

But Geri Lama, a GM spokeswoman, said Toyota won't be offering Virtual Advisor or access to Fidelity accounts to subscribers of its Lexus Link service due to stipulations in the contract between GM and Toyota. Honda customers will have access to the financial service offerings when the 2002 Acura RL ships later this year, she said.

"This will be a luxury product, initially," Gaw said. ◗

ONSTAR USERS will have hands-free access to stock quotes and market information.

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Microsoft Launches ISA Firewall Product

BY JAIKUMAR VIJAYAN

Microsoft Corp.'s new Internet Security and Acceleration (ISA) server software, announced earlier this month, should give users a fairly robust firewall and Web-caching technology, analysts said.

ISA, which Microsoft last week billed as its first product aimed purely at the security market, is a replacement for its entry-level MS Proxy Server.

The new technology is designed to combine the ability to protect a network from unauthorized access with an auditing capability that lets administrators inspect incoming and outgoing network traffic, according to Microsoft.

In addition, new Web-caching technology that's available with the server boosts overall application performance, the company said.

Beyond the Enterprise

The server is available in two versions: a standard edition that costs $1,499 per CPU, and a more scalable enterprise version that runs on larger servers that starts at $5,999 per CPU.

ISA, which runs as a server application on top of Windows 2000 Server, should give users an enterprise-class firewall, said Laura DiDio, an analyst at Cambridge, Mass.-based research firm Giga Information Group Inc.

"It will likely be of most appeal to Microsoft's installed base, but it can be up there with anything else in the market," DiDio said.

The product is designed to be used on networks running many operating systems, DiDio noted, and doesn't require an all-Windows environment to work.

ISA is one of eight Microsoft .Net server offerings. Others include Application Center 2000, BizTalk Server 2000 and Commerce Server 2000.

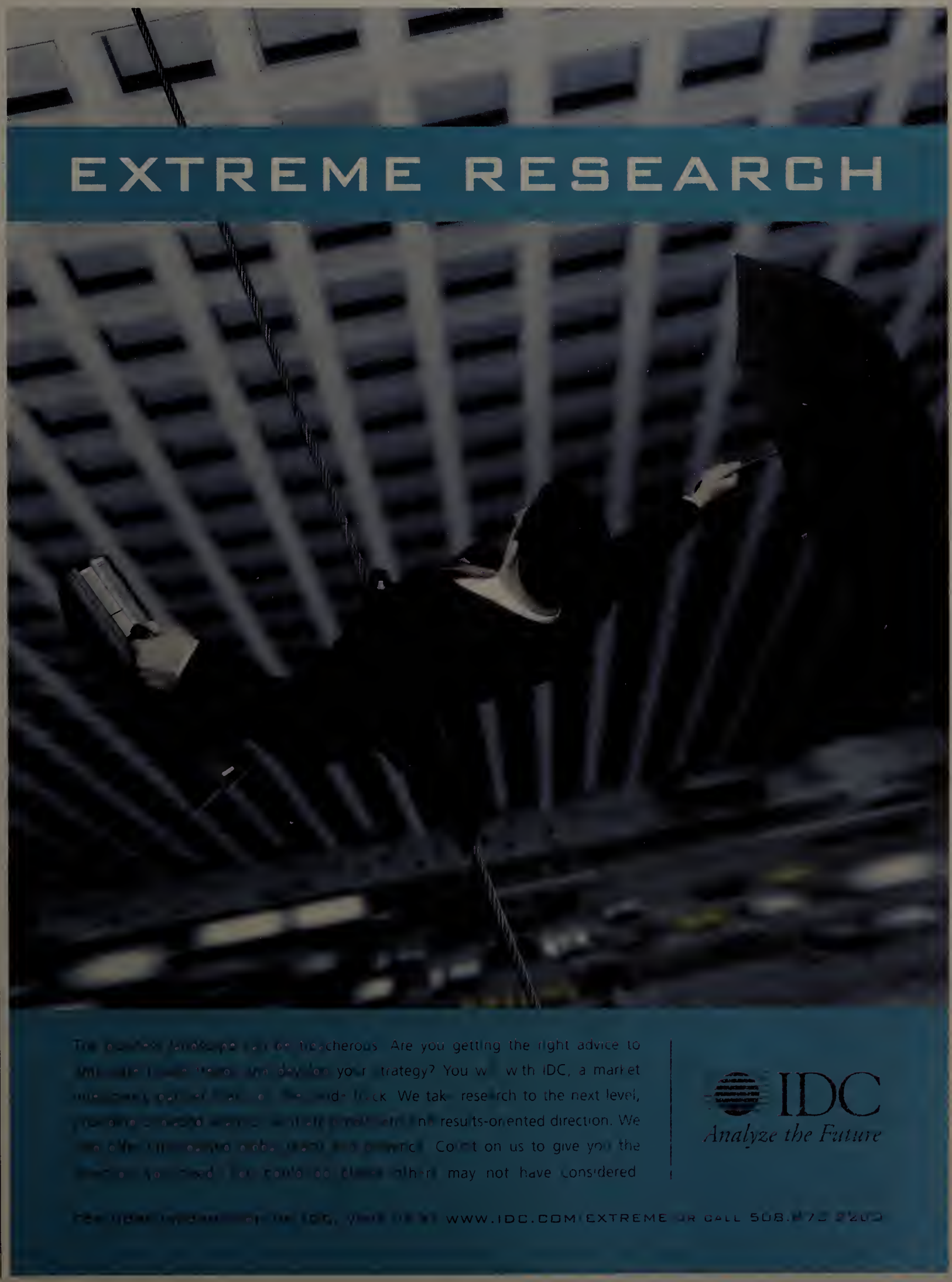
BRIEFS

Sun Releases Solaris 8 Update

Sun Microsystems Inc. has released the third update of its Solaris 8 operating system, adding about 30 new features. The update, called Solaris 8 1/01 OE, is available for SPARC and Intel processors for $75 to cover the cost of media and shipping.

Hospitals Can Track Equipment Wirelessly

Waukesha, Wis.-based GE Medical Systems and Billerica, Mass.-based PinPoint Corp. will team up to help hospitals track medical equipment using using wireless technology. GE has integrated PinPoint's wireless monitoring technology into its asset-management product, enabling employees to see the location of equipment by looking at a computer screen.



'I Hired a Hacker': A Security Manager's Confession

The new security department hire must be good because he's already broken into the system

BY MATHIAS THURMAN

I'M SITTING at my desk, having a cup of coffee and a toasted bagel when I notice this young, blond, pimply-faced kid standing outside my cube with this smirk on his red, puffy-cheeked face. I ask him what I can do for him, and he hands me a piece of paper with a Web site address written on it. It looks like an address that a customer would use to access the application that we host.

I ask what this is all about and he introduces himself as one of our company's application developers. He explains that he likes to "kinda hack a little bit" on the side and how he "discovered this" while playing around at home. I take the Web address, type it into my browser, hit Enter and a list of customer names, addresses, phone numbers and credit card numbers appears on screen.

Security Manager's Journal

Uh-oh. This information is normally supposed to be accessible only through a series of authentications, but the address bypassed the authentication mechanisms and displayed the data. The kid goes on to explain to me how the application programming interface (API) isn't configured properly and how many other pages can be displayed by bypassing the authentication screens. I thank him for the information, take a few notes on the details of the authentication API and then begin to interview him.

He's just 23 years old and has been playing with Linux since he was 14, started programming at 16 (for fun, he says) and has had part-time and full-time jobs as a Unix and Windows NT administrator and as an application developer for the past six years. He has no college education (but has just enrolled), and security is his hobby.

Eureka! I've hit the jackpot. A perfect fit for my plan to conquer the world. Even better, the application development project he has been working on was finished and he had been expressing an interest in security for some time. To make a long story short, I put in a request to have this kid transferred into my group. He's Unix-savvy, bright, articulate and, best of all, he knows our business very well. He's been working as a developer for almost two years and therefore has an extreme in-depth knowledge of the application we host and sell to customers.

As many readers probably know, security professionals are extremely difficult to find. In my experience, there are many of what I call "articulate incompetents": those who make great managers but can't do the keystroking if their lives depended on it. They can address a variety of audiences and wow them with security lingo and pontifications on security best practices and the ramifications of weak security. But ask them to install and configure a firewall-to-firewall virtual private network and they don't have a clue. In a large or consulting organization, security professionals of that type will fare well and are often needed. In a start-up environment, however, even the manager needs to get his hands dirty.

What's difficult is finding a mix of well-rounded individuals with good communication skills and some business sense, combined with years of hands-on Unix, Windows NT, programming and, most important, hacking skills. Yes, that's right, hacking skills. I've been involved in many hiring processes and in my experience hackers make the best employees on a security team. They're dedicated, disciplined, savvy and very technical. Yes, I sometimes have funny feelings about these folks, but as long as they pass a full background check and they have a reputable résumé, I'm comfortable.

I believe that 98% of the people in this world are genuinely good. Most hackers, when faced with the opportunity to take advantage of a weakness and exploit it for some fiduciary gain, will shy away. Take a look at most of the "hacked" Web pages out there. The verbiage is that of an adviser: "This Web site hacked by [whomever]," or "Your security sucks. Your original home page is here [link to page]." Yeah, it's embarrassing and makes you feel violated, but most hackers will stop after they've hacked the Web page. Don't get me wrong, I would never hire anyone who I felt was a criminal. I've got a fairly good sense about people, and I haven't made a hiring decision I've regretted. Anyway, that's my 2 cents on today's hackers and why I usually don't have a problem hiring them.

Shopping Spree Begins

I spent the rest of the day on the phone with vendors, placing my initial requests for security software. I decided to go with Atlanta-based Internet Security Systems Inc.'s (ISS) RealSecure intrusion-detection software (IDS). I've used this tool before, and the only problem I had was with bandwidth.

When selecting an IDS product, you have to make sure that the tool will continue to be effective at the upper limits of your network bandwidth. In our case, the aggregate bandwidth never exceeds 8M bit/sec., even though we're on a 100M bit/sec. switched architecture. But there comes a point at which an IDS will start dropping packets. Some folks call this "sampling mode."

In any case, I don't want my IDS to miss anything, so I'm very picky about performance. I've done a lot of work testing IDS performance in a very controlled environment. And, being a start-up, we can't afford the $10,000-per-month outlay for an outsourced monitoring service. RealSecure is easily configurable out of the box, and the alerts are meaningful enough that, with moderate training, I can leverage our operations center personnel to react appropriately when something goes bump in the night.

In addition to RealSecure, I went ahead and placed an initial request for ISS's Internet Scanner and Database Scanner products. Like RealSecure, I've used them in the past and have been extremely satisfied. I feel that ISS's scanner, in conjunction with some free tools like the Nessus security scanning software and the Nmap port scanner, will be 98% effective in discovering any potential or glaring holes in our infrastructure.

The biggest problem with scanners is the corrective action necessary to fix the discovered vulnerabilities. It's always a challenge to get the system administrators to make changes to live production systems. As a security manager, you have to put on the hard hat and start acting as a threat broker and change agent. I usually like to demonstrate the vulnerability associated with the recommended corrective action. When I can show the hack, folks are more receptive and more willing to implement change.

I also started getting quotes for SecurID tokens from RSA Security Inc. in Bedford, Mass.; a Tripwire file integrity checking software from Tripwire Inc. in Portland, Ore.; and the latest commercially supported version of the SSH secure session software from F-Secure Corp. in Espoo, Finland.

Next time, I'll explain in detail my awesome IDS testing experience. It was actually fun for all of us . . . well . . . except the vendor. ◗

LINKS:

http://secinf.net/iidse.html: Readers interested in learning more about network security and intrusion detection should check out the Network Security Library Web site. The site, which acts as an information repository for both hackers and security managers, contains links to some very well-written, recent papers. Timeliness is key in researching network security, because the technology is always changing.

www.net-security.org/text/articles/thejian/hiring.shtml: For those readers who think I'm crazy for hiring hackers, the article "Issues: Hiring hackers, the fine line between cult and criminal" at the Help Net Security Web site lays out the arguments supporting my decision.

www.iss.net: Internet Security Systems Inc.

www.nessus.org: The Nessus project Web site's goal is "to provide to the Internet community a free, powerful, up-to-date and easy to use remote security scanner." Check it out.

www.insecure.org/nmap: The Insecure.org hacker Web site is a source for the nmap port scanning tool.

www.rsasecurity.com: RSA Security Inc.

www.tripwiresecurity.com: Tripwire Inc.

www.fsecure.com: F-Secure Corp.

■ This week's journal is written by a real security manager, "Mathias Thurman," whose name and employer have been disguised for obvious reasons. It's posted weekly at *www.computerworld.com* to help you and our security manager better solve security problems. Contact him at mthurman@hushmail.com or head to the Security Manager's Journal interactive forum.

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Glow, Little Glowplate, Glimmer, Shimmer

Brighter flat-panel displays that consume less power are coming out of the labs and into our handhelds, thanks to OLED technology. By Sami Lais

EVEN THOUGH THE 2.4-in. screens won't go into production until later this year, prototype displays using organic light-emitting diode (OLED) technology are knocking the socks off trade show audiences nationwide.

The self-luminous OLED technology from Eastman Kodak Co. in Rochester, N.Y., cvokes visions of a clearer, brighter future for everything from cell phones and digital cameras to, eventually, laptop PC displays. Bear in mind, however, that this is technology whose performance is still being tested.

But David Mentley, vice president at research firm Stanford Resources Inc. in San Jose, says he see a promising future for the technology. What was a $3 million market in 1999 will grow to $717 million by 2005, according to a Stanford Resources report.

That may be pushing it, says Chuck McLaughlin, principal at McLaughlin Consulting Group in Menlo Park, Calif. "There's a lot of la-la-land hype, but development time is usually measured in years," he says.

During the next five years, OLEDs will begin to edge out 8-in. or smaller LCDs, "especially in products requiring color, wide viewing angle and low power consumption," says Kodak spokesman Joseph Runde.

Visible Differences

Thc contrast between two handheld TVs from Tokyo-based Casio Computer Co. illustrates the advantages of the new technology. One is standard issue, and the LCD-generated image is ghostly pale. In the othcr, rctrofitted with an OLED display, Runde explains, thc same image is clear and thc colors are more saturated.

The self-luminous OLED displays need no backlighting, and without lamps, they're thinncr than conventional LCDs. They're so thin and flexible that a display may someday be made that can be rolled up into a tubc, Runde says.

Powcr savings accrue bccause only the pixels needed to producc an imagc are lit, unlike with an LCD, in which all thin-film transistors (TFT) rcmain lit as long as the unit is on.

Small screens are appearing in car audio equipmcnt and cell phones. Pioneer Corp. in Tokyo holds an OLED license from Kodak and features passivc-matrix OLED, which it calls organic electroluminescence (OEL) technology, in some of its car audio equipmcnt. Unlike the active-matrix OLED, the passive version doesn't have a backplane with its own processing capability built into its glass substrate. It's a less-sophisticated technology, well suited to low-information-content applications such as alphanumeric displays, according to Kodak.

The Timeport P8767 cell phone from Schaumberg, Ill.-based Motorola Inc. uses a Pioneer OEL display.

But it's "the Ulvac deal that's going to be really important" in bringing full active-matrix OLED to the market, Mentley says. Under the terms of a deal Kodak has signed with Japan-based Sanyo Electric Co. and Ulvac Japan Ltd., the first prototypes will be ready next month, with mass production scheduled for next year, says Akihiko Oiwa, chief planner at Sanyo.

Sanyo provides the TFTs used in the active-matrix OLED displays. Kodak's OLED technology specifies organic materials, number and composition of layers, and the method for evaporating the materials onto the TFT substrate. Ulvac will build equipment to combine the two technologies to produce the final product.

"Initially, Sanyo is planning to use the OLED technology in [2.4-in. displays for] mobile phones and personal digital assistant devices," Oiwa says.

The 5.5-in. screens will be for portable DVD players, car navigators and any devices in which LCDs are currently used, Oiwa says.

By the end of this year, Kodak and Sanyo plan to demonstrate a 10-in. active-matrix OLED display, says Kodak spokesman Daniel Gisser, although laptop-size screens are years away.

When Newer Isn't Better

The technology is promising, says McLaughlin, but don't write off LCD and conventional LED technologies. For example, he says, it's doubtful that the OLED display can retain its brightness in full sun.

And it's significant that the technology is available in aftermarket car audio equipment but "no one in the automobile business will touch them with a barge pole," McLaughlin says. That's because automakers want a product that will last about 10 years, or as long as the car, he says.

"There will continue to be areas in which conventional LED technology will be the most suitable choice," Oiwa says. And there have been "difficulties in developing to the product levcl," he says, including establishing stable mass-production technology and resolving reliability and durability issues. But, Oiwa adds, Sanyo is working on these problems in preparation for mass production next year.

Power consumption by active-matrix OLED displays "will be 20% less than that of standard TFT LCDs," Oiwa predicts.

"[The] 2.4-in. and 5.5-in. active-matrix OLEDs use about a third to a half the power of comparable LCDs, respectively," says Runde. "But further improvements are coming."

OLEDs

1. Voltage is applied to the **metallic cathode layer**, producing electrons that pass through the

2. Electron transport layer, to the

3. Emissive layer.

4. The **anode (hole-injection) layer** produces positively charged "holes" that pass through the

5. Hole-injection layer and the

6. Hole-transport layer, then on to the

7. Emissive layer, where the two charges combine and generate light (electroluminescence). Kodak "dopes" this layer with a small amount of highly fluorescent molecules to boost the amount of light that's produced. This light continues as long as the charge is applied.

8. Each cell or stripe in the emissive layer has evaporated on it **organic metalized dyes**, in red, green and blue. When the cell is excited, its light is filtered by the dye and light passes through the

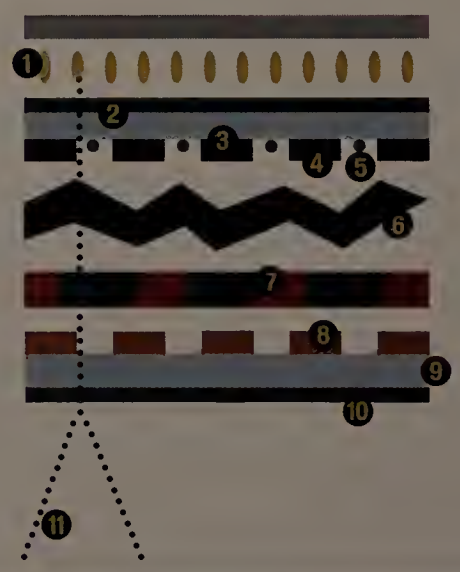
9. Transparent anode and the

10. Outer glass substrate, which contains

11. Thin-film transistors, one for each cell, to control whether that ceil is excited.

12. Because OLEDs emit in all directions, the **viewing angle** is 160 degrees. Also, OLEDs respond quickly to changing signals, allowing for full-motion (30 frames per second) video.

LCDs



1. Lamps provide backlight, which passes through a

2. Polarizing filter to the

3. Glass substrate.

4. A positive or negative goes through **transparent electrodes** embedded in the substrate and turns on the

5. Thin-film transistors.

6. Light shining through the glass substrate strikes the **LCD material** and passes through to the

7. Color filter.

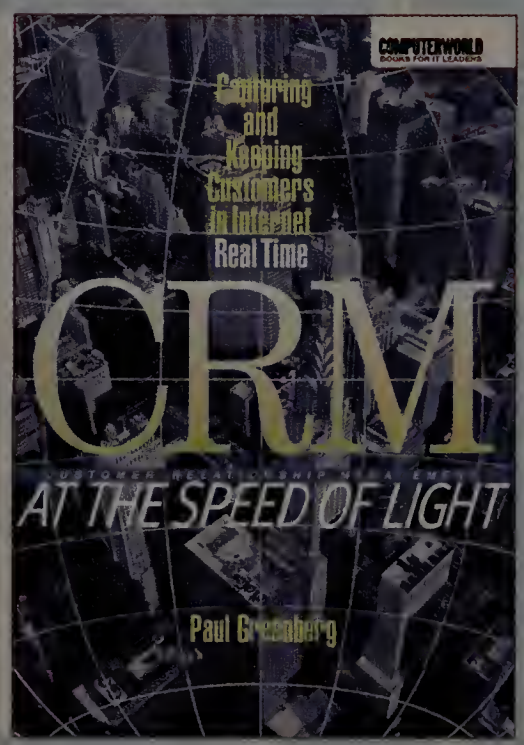
8. The positive or negative charge coming from the electrodes is received by the **transparent anodes** and passes through the

9. Outer glass substrate.

10. Light continues through a **polarizing filter.** The two sets of polarizers move more or less perpendicularly to one another to let in less or more light. It takes more than 40 microseconds for the filters to respond to the LCD material.

11. Because of backlighting, viewing the screen from an angle of more than about 40 degrees causes **color and light shift.**

another millisecond, another dollar.



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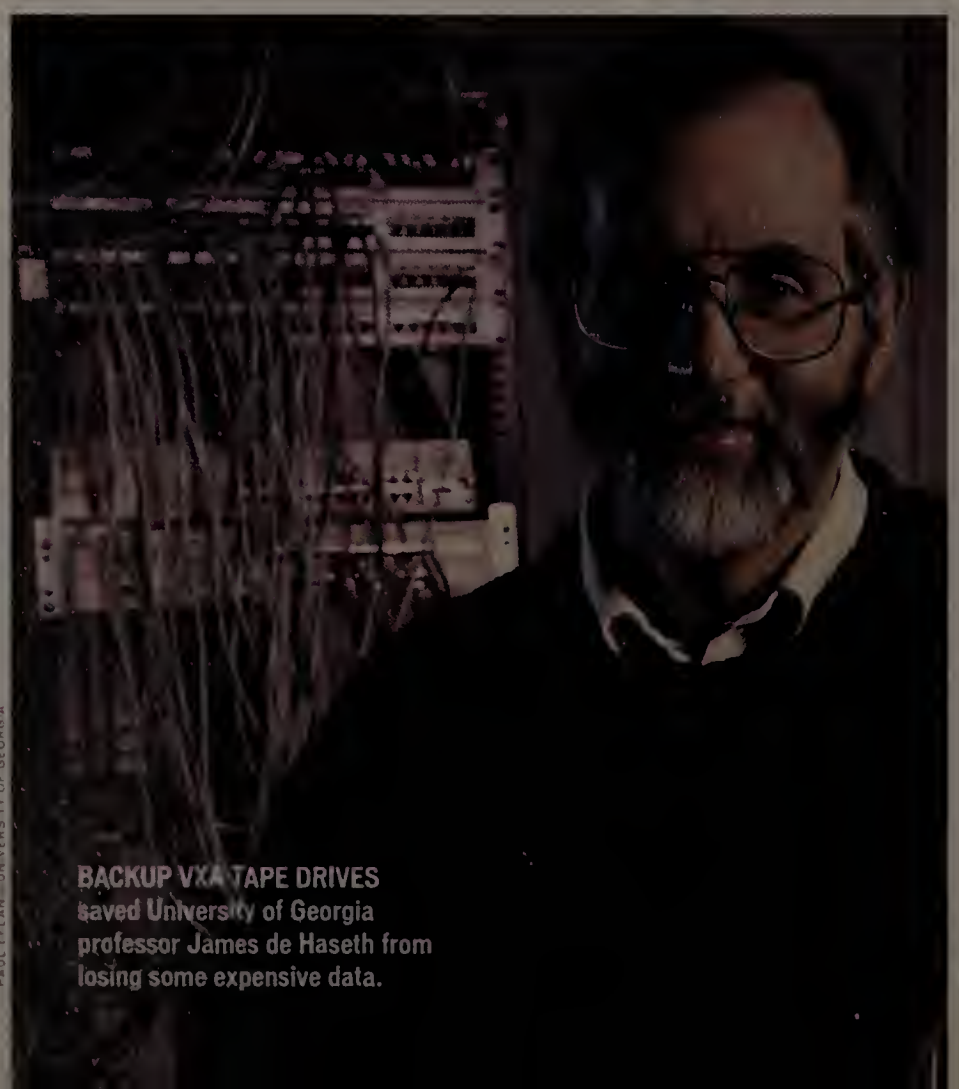
THE TERABYTE TAPES

Modern science and e-commerce generate data on an unprecedented scale. Backup is more critical than ever – and magnetic tape is still the medium of choice. By Howard Millman



PAUL FELAN/UNIVERSITY OF GEORGIA

BACKUP VXA TAPE DRIVES saved University of Georgia professor James de Haseth from losing some expensive data.

TO HELP SOLVE THE ARCANE MYSTERIES of molecular structures and human health, scientists at the University of Georgia in Athens use some of the world's most advanced technologies — including tape drives.

Each day, chemistry professor James de Haseth collects between 10MB and 100MB of measurement and observational data that will help researchers better understand mammalian immune defense, viral replication and cell growth systems. "This data is very expensive to obtain" says de Haseth. "Although it can be collected in a matter of minutes, the isolation and purification of the data can cost $10,000 or more." His lab uses a mix of Windows 98/NT/2000, Linux, Solaris and OS/2 desktops and servers.

Protecting that data against loss is crucial to de Haseth's research, and that means backup. A few years ago, he installed multiple VXA-1 tape drives from Ecrix Corp. in Boulder, Colo., to replace the lab's overburdened Digital Data Storage-2 tape drives. Later, he almost lost everything. "Things went awry," he says. "I was attempting to add new features to a backup server that controlled the existing tape drives, and I made some grave errors." Fortunately, the VXA drives helped him recover much of the data.

The experience that de Haseth had underscores the need for regular, reliable data backup, and it shows how skyrocketing storage demands can overwhelm existing backup systems. This isn't just a problem for scientists; e-commerce sites generate staggering amounts of data that must be backed up. Magnetic tape is the traditional data backup medium; it's cheap but relatively slow, and per-tape capacity has historically been limited. Yet tape technology is keeping pace, as vendors continue to develop higher-performance, higher-capacity tape systems.

Three New Tape Types

Just coming into the market now are three tape formats — Super Digital Linear Tape (SDLT), Advanced Intelligent Tape (AIT-3) and Linear Tape Open (LTO). These offer Texas-size appetites for data archiving, a market that IDC in Framingham, Mass., predicts will grow 25% per year, reaching $5 billion by 2003.

SDLT, a successor to Milpitas, Calif.-based Quantum Corp.'s popular DLT 8000 format, stores up to 110GB per tape cartridge at a transfer rate of 10MB/sec., about doubling the capacity and speed of DLT 8000. Quantum projects that SDLT capacities will ultimately increase to 1TB per cartridge, while transfer rates will climb to 100MB/sec. And new SDLT drives will read cartridges recorded in the older DLT 4000, 7000 and 8000 formats.

Park Ridge, N.J.-based Sony Electronics Inc.'s AIT-3 cartridges, available this quarter, will offer a 100GB capacity per cartridge, with a transfer rate of 11MB/sec. AIT-3 is fully read-and-write backward-compatible with prior generations. AIT-4, expected in early 2004, will reportedly double AIT-3's capacity and transfer rate.

LTO, a competitive technology sponsored by Hewlett-Packard Co., Seagate Technology Inc. in Scotts Valley, Calif., and IBM, will store up to 100GB per cartridge at transfer speeds up to 15MB/sec. Looking ahead to 2003, advances in LTO technology might see drives storing up to 1.6TB at the incredible (at least for tape) transfer speed of 320MB/sec. To accelerate file restoration and cataloging, both LTO and AIT cartridges include onboard memory that gives fast access to the cartridge's file index.

Several factors have triggered the growth in storage needs, most notably the Internet. The meteoric growth of multimedia enriched Web pages, e-commerce transactions and the Web's vast and ever-changing storehouse of documents account for a large part of the anticipated 500%

Options for Backing Up Terabyte Data

FORMAT	MAJOR VENDORS	PRICE*	MEDIA TYPE	CAPACITY NATIVE/ COMPRESSED	MEDIA COST	TRANSFER SPEED MB/SEC.	RELIABILITY (mean time between failures)	SPECIAL FEATURES
Super DLT	**Quantum** www.quantum.com	**> $6,000**	.500 linear	110GB/220GB	**$150/cartridge, $1.35/GB**	11	250,000 hours	Optical server, bulk-erasable, infrared external diagnostics; due next quarter
AIT-2	**Sony** www.sony.com	**> $5,000**	8mm helical scan	50GB/100GB	**$90/cartridge, $1.80/GB**	5	250,000 hours	**Memory in cartridge, automatic head cleaning
Mammoth2	**Exabyte** www.exabyte.com	**> $4,500**	8mm helical scan	60MB/120MB	**$95/cartridge, $1.60/GB**	12	300,000 hours	Capacities to 90TB, automatic head cleaning
LTO, Ultrium (high capacity)	**HP, IBM, Seagate** www.lto.org	**$5,500**	.500 linear	100GB/200GB	**$140/cartridge, $1.40/GB**	15	250,000 hours	**Memory in cartridge, capacities to 240TB by this year's fourth quarter
LTO, Accellis (fast access)	**HP, IBM, Seagate** www.lto.org	**Not available**	8mm linear	25GB/50GB	**Not available**	20	300,000 hours	Available in the third quarter of this year
VXA AutoPak	**Ecrix** www.ecrix.com	**> $4,500**	8mm single drive +15GB to 33 GB	495GB/990GB	**$77/cartridge, $2.33/GB**	6 per drive	300,000 hours	Variable speed, discrete packet recording format
DVD-RAM	**Panasonic, Hitachi** www.panasonic.com, www.hitachi.com	**$25,000**	Four drives	2.3TB/4.6TB	**$20 per disc, $2.10/GB**	5.4 per drive	250,000 hours	100-year life, random-access discs, zero head-crash liability

*Excludes backup software, which ranges from $400 to $4,000, depending on operating system, number of licenses and availability of centralized/remote management features.
**Memory in cartridge embeds information about the tape contents, its file directory, number of times used, etc., to improve reliability and reduce load time.

growth in enterprise storage needs over the next three years.

Other causes for the increase are more basic. "No one wants to delete files any more, and files sizes are increasing significantly," says Derek Gamradt, chief technology officer at StorNet Inc., a data storage services firm in Englewood, Colo. Gamradt says he sees a need for storage that will accommodate the use of ever more sophisticated documents, including presentations, graphics and eventually audio and video attachments. The increase is also driven by the escalating demand by new businesses, such as telecommunications.

Ed Presutti, manager of network security and engineering at US Unwired Inc., a telecommunications services firm in Lake Charles, La., says his company's data storage requirements have more than tripled in the past two years. The data is generated by 1,000 internal employees and the company's 100,000-plus subscribers.

"We are now over the 1TB mark. When we link our accounting and financial systems with data warehousing and point-of-sale information, we will expand to a 3TB solution," he says.

Heading Presutti's wish list for storage improvements is faster throughput. "No matter what technology you use to back up your data, it just does not seem fast enough," he says. "We are also hoping to see tighter integration between the backup software, tape devices and storage-area networks."

To help ensure that tight integration, Presutti often asks aspiring vendors for an on-site product demonstration. "In our environment, what [a product] does in a lab and what it does on our network may be totally different," he says.

Tape's traditional popularity is partly due to its scalability. The technology lends itself to building multidrive, fault-resilient storage-area networks (SAN). Where throughput is important, as in retrieval operations, SANs can leverage the low latency of newer tape drives and offer fast access to multiterabyte data stores.

Despite all the advances and intelligence built into SDLT, LTO and AIT, they still depend on a linear data stream, so it's time-consuming and inconvenient to restore selected, non-contiguous files. To some degree, a hierarchical storage management (HSM) system can compensate. In this three-tier architecture, software automatically moves files between the various media — RAID, DVD jukeboxes and tape libraries. File transfers can be based on content, type, date or frequency of use. With HSM, new and frequently needed files are stored on RAID systems. Less frequently used files are moved onto near-online DVD jukeboxes. Rarely used files are archived to tape libraries, often at remote locations.

In what could be good news for some network administrators and a clarion of doom for data center managers, the benefits of outsourcing may encourage companies to outsource their backup operations.

William Hurley, an analyst at The Yankee Group in Boston, predicts that lower-cost, widely available broadband will increase the adoption of off-site storage and related document management services. The off-site approach could eliminate the need to assign scarce resources to on-site storage systems. So-called e-storage sites, run by firms such as Zantaz.com Inc. in Pleasanton, Calif., GiantLoop Network Inc. in Waltham, Mass., and Archive Inc. in Culver City, Calif., promise 99.5% uptime, two-hour problem resolution and infinite scalability.

"Outsourcing backup operations to [sites like Boston-based Iron Mountain Inc.'s] storage centers is cheaper, faster and provides more consistent results than archiving data in-house," says Hurley. "And you have outside people assisting you with the process . . . so you don't have to assign even junior-level technicians to this task."

In addition to eliminating infrastructure, maintenance and re-engineering expenses, e-storage offers real-time searches and retrieval as well as on-demand replays of key transactions.

Jim McDermott, CEO of Archive, predicts that document management services offered by e-storage application service providers will enable once-static data backups not only to protect the data but also to help form a knowledge base. "Much of the data companies now use, such as purchase orders and correspondence, originates with external sources," McDermott says. "This is a way to not only store that information but to get fast, convenient access to it from anywhere."

Today, you can choose from multiple hardware and media technologies to protect your company's data. But backup technology is about to take some giant steps forward in capacity and speed, so the equipment that you commit to now may be outdated in a year.

What factors should you weigh before buying? Not the cost, says Presutti. "Price is an important factor, but so is quality," he says. "Look for a strong product from a strong company." ◗

Millman is a freelance writer in Croton, N.Y. Contact him at hmillman@attglobal.net.

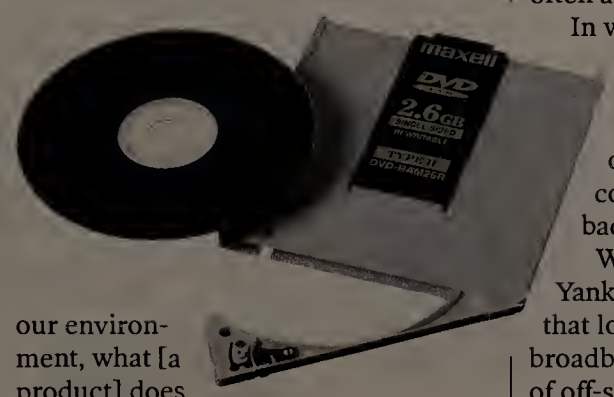
DVD Backs Up

DVD RAID or drive libraries are beginning to compete on price with hard drive and CD-ROM libraries, enabling network managers to synchronize backup, mirror or striping operations. One such DVD library, offered by Golden, Colo.-based Asaca ShibaSoku Corp. of America, consists of up to 192 rewritable DVD-RAM drives holding 9.4GB each.

DVD might deserve a place in your backup strategy, especially if:

- You need to restore selected files quickly
- You have to back up video files that require a constant feed rate
- Your data must never suffer from a mechanical head crash
- Your data must last for at least 100 years

– Howard Millman



Betting on Win2k

Online auction vendor Freemarkets has bet its future on Windows 2000 Datacenter Server and SQL Server 2000. Can the new architecture deliver?

By David Essex

EXECUTIVES at online auction provider FreeMarkets Inc. had a problem. Explosive growth was creating demand for higher scalability and uptime from the data center, but the Windows NT Server 4 infrastructure — a Web server farm with back-end systems built on top of Microsoft's SQL Server 7 — was running out of gas. With IT systems at the core of FreeMarkets' business, it was a problem that could strangle growth.

The Pittsburgh-based company helps business users set up and manage online auctions for industrial parts and other commodities using FreeMarkets' FullSource and DirectSource services and FreeMarkets Desktop end-user application. Sales have grown fast. In the first half of last year alone, the company exceeded the $3 billion in trades it had executed the previous year.

To support that growth, says Tony Bernard, FreeMarkets' director of technical architecture, the company needed "five nines" availability (99.999% uptime) and a more scalable infrastructure than its NT-based systems offered. "We would reboot our servers once a month," he says.

FreeMarkets also wanted to implement QuickSource, a major upgrade of its do-it-yourself auction service. The company had to pull this off without affecting the availability of its applications.

A Matter of Choice

In late 1999, FreeMarkets made the initial decision to migrate the data center to the yet-to-be-released Windows 2000 operating system and to overhaul the company's production servers "to have a more scalable and reliable architecture for our application environment," recalls John Benzinger, FreeMarkets' vice president of IT.

Windows 2000 was promising the scalability and reliability FreeMarkets needed. But it wasn't a shoe-in: With a large number of its key applications written in Java, the company seriously considered using Linux. "The drawback was that in most cases, it was going to mean a forklift upgrade for our data center and complete retraining," Bernard says. The company determined that going exclusively with Microsoft Corp. development tools and architecture would help simplify product development in ways not possible with a more Java-centric approach, he says. "There were too many vendors, too many components, too many pieces of the puzzle," Bernard says of Java.

By early last year, a plan was put in place to migrate Web servers and QuickSource database servers in a "guinea pig" phase for the migration project.

FreeMarkets programmers were confident that they could handle the Web server upgrades, says Bernard. But as the company began a redesign of its database tier, it called in Brenda Basista, a consultant in the Enterprise Consulting Services division at Compaq Computer Corp., to do a high-availability assessment of the existing environment.

"They had a lot of redundant servers," Basista recalls, with key databases scattered across eight Windows NT 4 machines. After three months of analysis, "we determined that clustering was the right way to go," she says. "We started playing with Microsoft [Windows 2000] Advanced Server in a clustering environment."

By early spring, a team of Benzinger's operations experts had tested some auction components on Windows 2000 servers, and Mark Tyrrell, a consultant at Microsoft's Pittsburgh office, joined the effort.

In July, FreeMarkets entered Microsoft's Joint Development Program (JDP) for Windows 2000 Datacenter Server. "We thought we could learn a lot about Windows 2000 by participating in that Datacenter JDP program," says Bill Blair, FreeMarkets' chief technology officer.

FreeMarkets also ran a beta version of QuickSource on Windows 2000 servers that it had set up in a test lab. "Quite honestly, there was a litmus test," says Blair.

"We kind of knew how that application performed on NT 4," Bernard recalls. "We ran it on the new environment, and we saw a noticeable improvement."

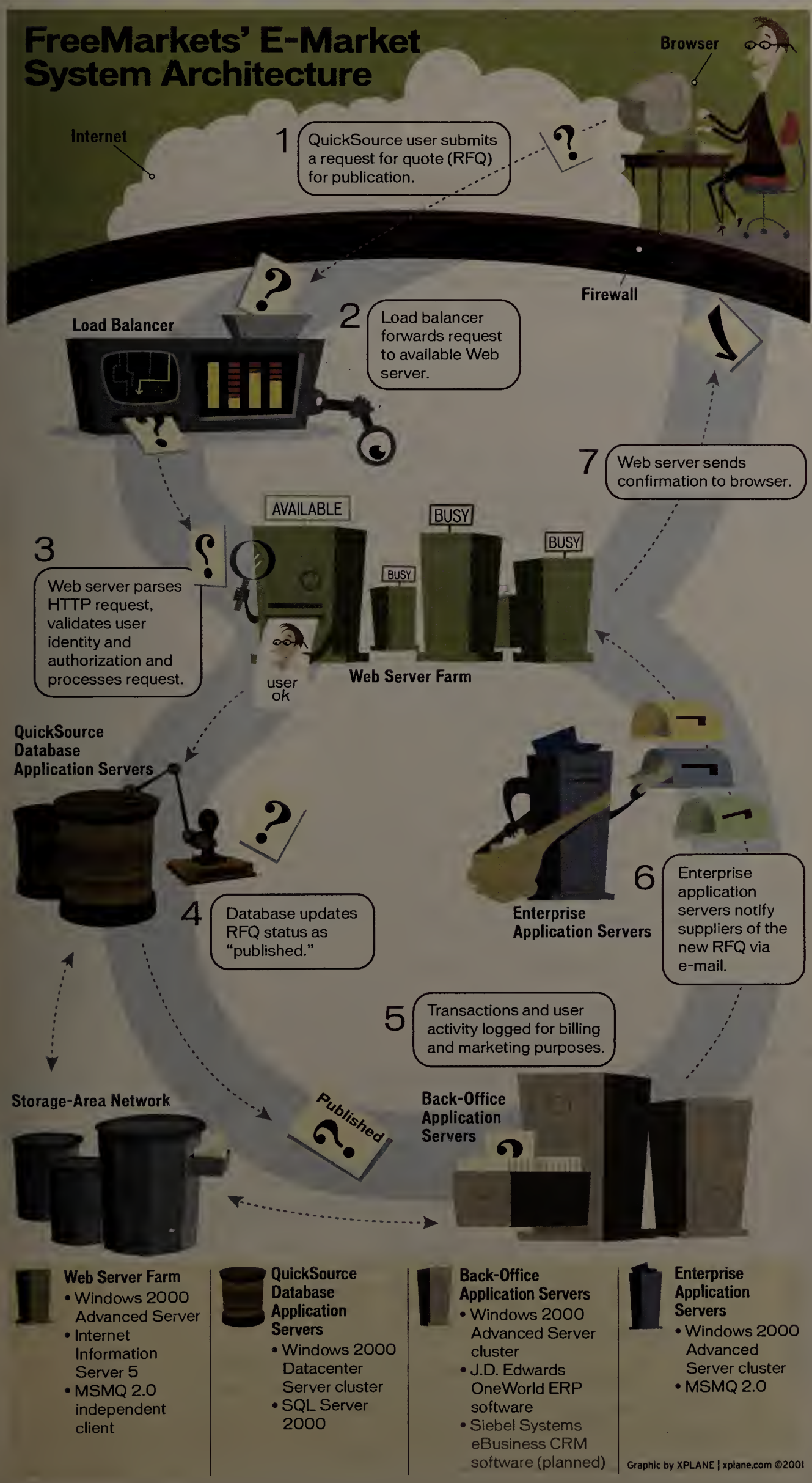
If You Build It ...

The team created an architecture that includes a QuickSource database application server cluster (dual Compaq ProLiant 8500 eight-CPU servers with 16GB of RAM running Datacenter Server and SQL Server 2000) with an enterprise application server cluster (dual ProLiant 8500 servers running Advanced Server) that handle interactions with suppliers (see diagram). A Compaq StorageWorks storage-area network (SAN) holds the databases. The SAN and the servers are linked via Gigabit Ethernet to dual-clustered back-office application servers running Datacenter Server and OneWorld enterprise resource planning (ERP) software from Denver-based J.D. Edwards & Co., which handles accounting and billing. A nonclustered Web server farm running Advanced Server serves QuickSource pages and handles incoming requests using LocalDirector load-balancing hardware and software from San Jose-based Cisco Systems Inc.

Only clustering could provide the needed fail-over features for the dynamic databases, Bernard says. FreeMarkets chose Datacenter Server because it scales to a four-node cluster and supports more memory and processors than Advanced Server. But the less-expensive combination of Advanced Server and LocalDirector was the best design for the Web servers.

"It's much more economical and efficient and flexible to do load balancing," Bernard says. "Our Web tier is typically where the bottleneck is, in terms of performance. [Datacenter Server] is just a more expensive configuration." He says that this setup makes it easier to scale

TONY BERNARD at FreeMarkets says he also considered using Linux.



front-end capacity by swapping out older servers and replacing them with faster ones.

Last September, FreeMarkets rolled out its QuickSource beta (then called Self Service), the first production application, on its new architecture. Some of the company's databases and basic auction components had also been moved onto the Windows 2000 servers, according to Benzinger. "We have a lot of supplier information that is part of all of our products," he says. "Those databases were migrated over." Bernard says he was satisfied. "We didn't have any issues I would even classify as significant," he says.

Uptime across the new system improved noticeably, Benzinger says. Monthly reboots, common with NT 4, became a thing of the past. But each reboot took 30 minutes longer when it was needed, he adds. Performance also improved; Web pages, for example, seem to load in about half the time, Bernard says. The new multiprocessor Compaq servers account for part of that difference, but "Windows 2000 itself is a faster operating system," Bernard says, and "SQL Server 2000 seems to perform better."

Both Bernard and Benzinger say they're impressed with the new system's reliability. The only negative, they say, has been the unavailability of Windows 2000 software drivers for running hardware such as laser printers from Hewlett-Packard Co. Also, porting custom applications from NT 4 to Windows 2000 has been tricky because the names of software libraries have changed. Benzinger and Bernard also say they fault Microsoft for having a licensing scheme that overcharges for copies of Windows 2000 that are needed for low-priority uses. "I don't need five-nines on my development server," Bernard says.

FreeMarkets' main challenge now is coordinating the various upgrades on the new servers, including the migration of its DirectSource and FullSource applications. Also, the company wants to add new e-business customer service, sales and marketing software from San Mateo, Calif.-based Siebel Systems Inc., but the certified upgrade won't be available until early spring. "We are not pleased that we don't have a 2000 version of that now," Blair says.

Earlier this month, just as QuickSource was about to ship, Basista was preparing for a major milestone: porting the Bidware bidding engine, used in FullSource and DirectSource, from SQL Server 7. The upgrade will later be certified in a Compaq laboratory. Unfortunately, the Bidware upgrade could be ready for months before Compaq can schedule it for certification, likely around midyear.

Also earlier this month, the company was preparing to go live with a partial migration to Windows 2000's Active Directory (AD) service, which Benzinger says will facilitate directory management and allow for consolidation of domain controllers. The AD rollout, however, creates quality-assurance issues that must be addressed with extensive retesting that has so far taken two months, he says. But FreeMarkets remains focused on the ongoing data center migration. "Our goal is to build a highly available Datacenter Server cluster running SQL Server 2000 and consolidate all of our databases," Bernard says.

So far, the results have been promising. FreeMarkets says maintenance costs have declined by 20% and auction capacity has risen 70% since the migration began in late 1999. ◗

Essex is a freelance writer in Antrim, N.H.

FUTURECOVERAGE

In a future installment, *Computerworld* will revisit FreeMarkets for an update on the outcome of its data center upgrade.

Uninterruptible Power Supply

BY ELIZABETH FERRARINI

IF YOU'RE WORKING AT your computer and electrical power to your office goes out, several bad things can happen.

For one thing, you could lose important data. And if the failure occurs while your system is writing data to disk, the disk's logical structure could suffer serious damage, and some files could be lost.

Even a brief power interruption (a few milliseconds) can cause problems. Longer interruptions mean more trouble. If your servers are affected, you could lose both business from customers and productivity from employees.

According to an IBM study, a workstation has more than 120 power problems per month. Power failures or surges account for 45.3% of all data loss, according to *Contingency Planning* magazine.

These conditions can be prevented by a good uninterruptible power supply (UPS) with an appropriate rating for your computer and network equipment. This can ensure clean power by correcting for sags or brownouts, spikes, surges and electrical noise.

If a blackout occurs, a UPS can page you and then automatically shut down the equipment. This transition time can ensure that you don't lose data, even that cached in memory.

Ever-slimmer rack-mounted devices — servers and disk arrays only a few inches high — let you fill just about every slot in a data center cabinet. This dense packing of equipment can aggravate loads on power supplies, possibly causing brownouts or even fire.

DEFINITION

An **uninterruptible power supply (UPS)** is a device that provides electrical power with a constant, regulated voltage output when the main supply of electrical power is interrupted. The device's filtering circuits feed computers, servers or related network equipment that could otherwise shut down or lose data during brief power interruptions.

What Kind of UPS?

UPS devices come in three different types; choosing the right one(s) can provide workstations and data centers with clean power while supporting the load during outages.

Standby power supply: Ideally suited for an individual workstation, the standby power supply, or off-line UPS, takes power straight from the wall outlet and passes it through. This configuration is called *single conversion*, meaning it converts power from AC to DC, charging the battery. When main power fails, an inverter operating in standby mode converts the battery's DC power to AC to support the load for a limited time.

Line-interactive UPS: This type of device, meant for important hardware, inserts an inductor in series between the outlet and the load. This inline inductor allows the UPS's inverter to accept the incoming power and provides power conditioning (regulates high and low voltage) to the load.

Like the standby power supply, the line-interactive UPS can be inexpensive and efficient because it supports the entire critical load only during power disturbances. However, it can isolate the critical load from the input only when it's running on its battery.

Double-conversion online UPS: This design offers a double power-conditioning process. Rectifiers purify incoming AC power to DC power to supply the UPS's DC bus. Likewise, the output inverter takes the DC power and produces regulated AC to support the critical load. During normal operation, batteries on the DC bus are charged. Whenever the input power is out of spec, the batteries support the inverter and the load. This design provides the best protection for servers, networking equipment and data centers.

The double-conversion online UPS, available since the 1980s, has a low power factor (see glossary), and extensive, high-power switching during normal operations can generate harmonic currents back upstream to the power line. These "harmonic distortions" disturb the voltage quality on the power line, potentially causing anything from computer malfunctions to fires. At the same time, a low power factor is inefficient, so you'll need an oversized UPS.

Today, many UPSs come with power-factor correction (PFC) circuits, thus they can quote a power factor of 1.0. This eliminates problems by drawing current in a linear fashion throughout the entire voltage waveform. This type of UPS can protect twice as many servers as one without PFC and is likely the best choice for rack-mounted gear.

In contrast, a UPS without PFC draws power from only a brief, peak-voltage segment of the supply waveform, which can cause distortion and drain as much as 40% more power than the UPS's current rating would suggest.

The Geneva-based International Electrotechnical Commission, the international standards body for all fields of electrotechnology, has proposed standards for harmonic distortion and electromagnetic interference and radio frequency interference that would require U.S. manufacturers to put PFC circuits in all types of power supplies.

Unlike the double-conversion UPS, the new delta-conversion online UPS reduces harmonic distortion by as much as 30% and provides up to 97% total energy efficiency.

Instead of using a rectifier to charge the batteries, bidirectional converters connected to a common battery pass power in either direction — AC to DC or vice versa — with minimal loss. The delta converter connects in series between the power source and the load and compensates for any difference between the required output voltage and the electric utility's supply. The main converter, meanwhile, keeps the voltage to the load stable and precisely regulated.

A Glossary of UPS Terminology

Each UPS you select should equal or exceed the total power requirements of the equipment connected to it. Here are the specifications:

VA: Voltage amperes, a measure of the power load that a UPS can support. To determine an individual VA rating, multiply voltage times amperage, or, to convert from AC watts, multiply wattage by 1.35. After you calculate the VA rating for each device, add them all together to get a total for all your equipment. The VA rating of your UPS should be at least 20% higher than the total equipment calculation.

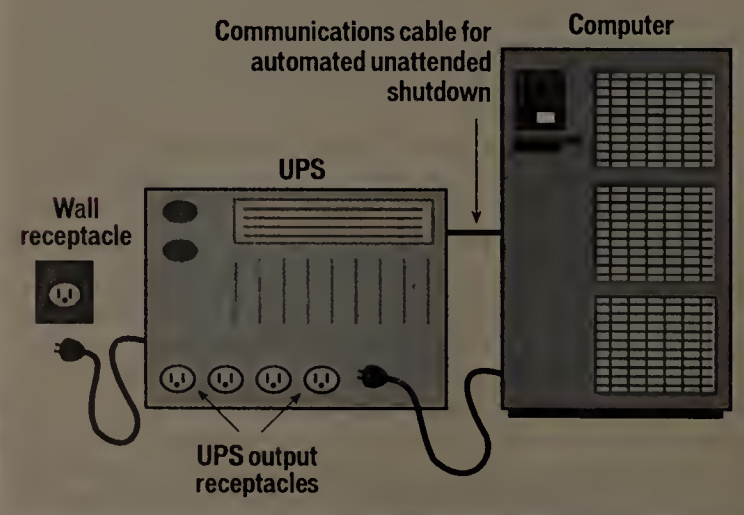
Power factor: The ratio of real power to apparent power or load. This value ranges between 0 and 1. A power factor of 1.0 indicates the current is in phase with the voltage and reactive power is zero. An efficient UPS is rated close to 1.0, such as .95 PF. To get true power consumption in watts for each piece of equipment, multiply the UPS power factor by the equipment's VA rating.

Run time: The length of time a UPS can provide its rated power while running on its batteries. The longer the run time, the longer PCs and servers can remain in use before they need to be shut down.

Joule rating: The amount of energy delivered by one watt of power for one second; also, the rating for the amount of surge a UPS can handle. A rating of 480 joules will suit a rack-mounted sever.

Surge protection: The vendor's measurement, usually in amperes, for how big a surge the UPS can handle. A UPS handling surges up to 6,500 amperes is adequate for workstations.

The Chain Gang



Ferrarini is a freelance writer in Boston. You can reach her at elizabethferarini@yahoo.com.

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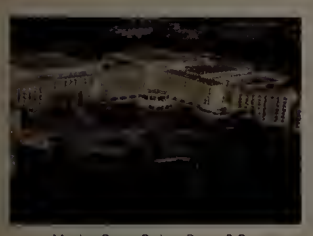

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Web Tool Makes for Good Conversation

NativeMinds customer service software responds to natural language questions

BY AMY HELEN JOHNSON

IN OCTOBER, Vic Nagy, hotline operations manager at Ford Motor Co. in Dearborn, Mich., hired a new virtual service representative he dubbed "Ernie." Powered by software from San Francisco-based NativeMinds Inc., Ernie answers questions over the Web about Ford's car problem analyzer, the Worldwide Diagnostic System (WDS), from repair technicians at 5,600 Ford dealerships nationwide.

"It has a uniqueness that we really like, a natural language interface," says Nagy. That means Ernie can answer questions posed in conversational format, such as, "How do I run the WDS on a field test?" Ernie has been programmed to understand what a technician means by "WDS" and "field test." Plus, it tracks the topic of a back-and-forth interaction with a technician, so if Ernie gets a follow-up question like "How do I hook it up?" it knows to what "it" refers.

Nagy says that context-sensitive capability and around-the-clock availability has made the system a valuable supplement to Ford's human-staffed help line, which is open only 12 hours a day, six days a week.

How Ernie Works

NativeMinds' NeuroServer is the brains behind Ernie, says Scott Benson, co-founder and chief technology officer at NativeMinds. Customers interact with NeuroServer via the Web, he says. A Web server processes the questions, passing them to the NeuroServer. When the NeuroServer finds an answer, it returns a Web page to the questioner.

NeuroServer runs only on Windows NT; a Solaris version is scheduled to ship in the second quarter, with Linux following before year's end, says Benson.

Chris Martins, an analyst at high-tech consulting firm Aberdeen Group Inc. in Boston, says NeuroServer's most important feature is its ability to step through a sequence of questions, where the follow-up question is based on the previous question.

That context sensitivity makes it able to drill down to just the right answer, he says, and is significantly different from the more common search engines that Web sites often use. NeuroServer doesn't take a question and search for multiple answers. Rather, Martins says, it finds the answer based on multiple questions.

Martins says effective applications of NeuroServer focus on a bounded set of questions. It's not meant to respond to any possible question, but to act as a guided interactive tool. Users teach NeuroServer its initial set of knowledge through a wizard-driven authoring environment. A Web-based interface allows companies to update NeuroServer's information set while the intelligent agent is up and running. But NeuroServer isn't limited to tapping the data stored in its internal database.

Easier, Quicker

At Ford, Ernie will search the WDS manual for information not found in its internal knowledge base, Nagy says. Linking directly to that database instead of loading duplicate information into Ernie means lower maintenance costs and no problems synchronizing two sets of data. Plus, when Ernie is truly stumped, the application automatically routes the customer's question and contact information to customer service for a callback, saving a Ford technician the effort of starting over with the customer's question, says Nagy.

Martins says the external data links make NeuroServer useful in areas where the questions are general but the answers are customer-specific. For example, he points to financial services, where many people have the same questions, but the answers need to bring in data from individual investment files.

Walter A. Tackett, co-founder and CEO of NativeMinds, says NeuroServer is best suited to answering "how-to" type questions. These questions can often cost $25 per incident when handled by a human operator over the phone, he estimates; using just e-mail or live chat only brings the price down to $10. With NeuroServer, he claims, companies can answer these how-to questions for only 50 cents each, when all costs are amortized.

NativeMinds is working on internationalizing NeuroServer, says Benson, allowing it to enter the Spanish, Dutch and French markets in the immediate future. Another focus of improvement is adding voice recognition so that customers can ask questions as well as type them. ◗

Johnson is a Computerworld *contributing writer in Seattle.*

JOHN HARDING

NATIVEMINDS CEO Walter A. Tackett (left, with Scott Benson) says NeuroServer can answer questions for 50 cents each.

NativeMinds Inc.

Location: 480 Second St., Suite 300, San Francisco, Calif. 94107

Telephone: (415) 777-3111

Web: *www.nativeminds.com*

Niche: Natural language Web-based customer service system

Why it's worth watching: The company's system can respond to natural language queries.

Company officers:
- Walter Tackett, co-founder and CEO
- Scott Benson, co-founder and chief technology officer

Milestones:
- January 1999: NeuroMedia is incorporated
- November 1999: First product is introduced
- June 2000: Changed name to NativeMinds

Employees/growth: 90; 225% growth per year

Burn money: $33 million from TA Associates, Oracle Venture Fund, CIBC Capital Partners, Horizon Ventures LLP, Camelot Ventures and Band of Angels Fund LP

Products/pricing: NeuroServer; $300,000 on average for software and services

Customers: Ford Motor Co., GlaxoSmithKline PLC, Deutsche Telekom AG, Western Provident Association

Partners: eAssist Global Solutions Inc. and Convergys Corp.

Red flags for IT:
- NeuroServer works best on a focused set of how-to information.
- Users need to learn NativeMinds' scripting language to build and maintain its database.
- NeuroServer has limited conversation capabilities.

COMPUTERWORLD emerging companies

[the buzz] STATE OF THE MARKET

Searching for Support

Chris Martins, an analyst at Aberdeen Group, says he sees NativeMinds' Web-based interactive customer support technology as part of the overall customer service software market. Martins says he expects sales in this category to reach approximately $7 billion this year.

And there are two areas of competition within NativeMinds' particular niche, says Paul Hagen, an analyst at Forrester Research Inc. in Cambridge, Mass. One consists of vendors that offer similar intelligent natural language agents. Hagen says he sees only marginal technology differences among these companies' products. He says the toughest competition comes from another category: knowledge base and search engine vendors.

Artificial Life Inc.

Boston
www.artificial-life.com

The capabilities of Artificial Life's virtual agents closely mirror those of NativeMinds, says Hagen. The agents have natural language processing capabilities, can carry on interactive conversations and will escalate incidents to a human upon reaching the limits of its knowledge.

Ask Jeeves Inc.

Emeryville, Calif.
www.askjeeves.com

The Ask Jeeves search service isn't close to NativeMinds in terms of implementation, but it has more mind share, Hagen says.

eGain Communications Corp.

Sunnyvale, Calif.
www.egain.com

The eGain Assistant intelligent agent conducts interactive conversations, gathers customer intelligence, provides an online brand and personality and allows companies to analyze customer interactions. EGain offers Assistant with its other call center and customer service applications.

Soliloquy Inc.

New York
www.soliloquy.com

Soliloquy focuses on gaining personal information from site visitors to create targeted product offerings. The company also provides a turnkey implementation service and a hosting arm.

– Amy Helen Johnson

Masters Of Business Intelligence

Success with business intelligence software isn't easy and can require a team of individuals, including database designers, software engineers, quality-assurance professionals and data modelers. By Mary Brandel

SHOP AT HOME INC. in Newport, Tenn., is deluged with customer information. Not only does it sell collectibles, gemstones and other items through its 24-hour television broadcast, but it also has a companion Web site — Collectibles.com — that lets customers order items or chat live with the show's hosts.

"We have so many channels that a person can come through that we have to understand the demographics and the program mix," says Lee Martin, vice president of systems development at the company. For example, he says, do customers order on the Web or on television, or is there a mix? Do more products sell on the Web vs. television?

Even more important to the broadcast and e-commerce company is balancing its average price point with its volume of combined phone and online orders. Right now, its price point is just less than $200 to attract higher-end jewelry buyers. But if it goes too high, call volume suffers.

"We have to look at our product mix from a strategic standpoint to best achieve profitability," Martin says. "And the only way we can find out that type of information as quickly as we need to is a business intelligence system."

What They Are

Simply put, business intelligence systems quickly and cost-effectively supply users with information to make strategic business decisions. Such systems encompass a range of software, starting with the extraction, transformation and loading tools that pull data from transaction systems and either prepare it for analysis or feed it into data marts or warehouses.

Data modeling is also involved, whether you plan to use a proprietary multidimensional database or a relational database. The business intelligence tools themselves range from complex query/analysis to simple reporting tools. They display information graphically so business users can quickly recognize key trends.

For an IT professional looking to get into the business intelligence field, many of the required skills are similar to those used in data warehousing.

"There are a lot of business intelligence tools out there," says Sharon Sibigtroth, managing director of strategic data management at New York-based AXA Financial Inc., a member of Paris-based AXA Group, one of the world's largest providers of insurance and financial services. "The issue becomes, 'Do you have the right data, and have you used good design principles behind the database that the tools are going against?' "

AXA is currently breaking up its large DB2-based data warehouse into data marts focused on functional areas so users can take advantage of business intelligence tools from the likes of Cognos Inc. in Ottawa. With as many as 4.5 million customers, AXA is trying to provide employees with an in-depth understanding of its customers from profitability, retention and cross-selling perspectives.

Sibigtroth says it's important to hire database designers and data modelers with a solid understanding of multidimensional and relational databases. "If they start to use the tool and don't understand the architectural fundamentals, their cubes or reports won't perform very well," she says.

RAQUL BENAVIDES

HEALTH RISK MANAGEMENT'S Ken Buchanan takes a team approach to working with his company's business intelligence system.

Team Approach

Combine business skills with a solid footing in databases and queries, and you have a great mix for business intelligence systems. But it doesn't all have to come from one person. Shop At Home Network has created a team of three senior developers for its Oracle-based business intelligence system.

One team member is responsible for creating the end user's view into the data. Another is a business analyst and project lead who finds out what types of queries are needed and how users want to see information summarized to create the best system design. The third, a database administrator, is responsible for the physical structure of the warehouse itself and making sure it gets loaded correctly so users get the right information.

In order to get top recognition as a business intelligence guru, it's best to take a renewed interest in how your business works. After all, the point of business intelligence is to give users near-instantaneous access to new information and enable them to make mid-course corrections on a regular basis.

For example, Ken Buchanan, vice president of information reporting at Health Risk Management Inc., relies on his team of database administrators, software engineers, quality-assurance professionals and data modelers in order to be able to use the most sophisticated capabilities in the company's business intelligence system from MicroStrategy Inc. But, he says, he also relies on professionals who are "somewhere between technicians and content experts," some of whom are businesspeople with an aptitude for technology.

Minneapolis-based Health Risk Management provides health plan management and information services to managed-care and insurance companies. The system from Vienna, Va.-based MicroStrategy enables it to build reports for a variety of users and allows these users to receive the reports in the format they choose and even provides parameters for the reports they want to see.

In some ways, IT professionals in the business intelligence field have to be one step ahead of business users.

"Quite often, the tool gets bogged down because the users are doing things they didn't tell you they wanted to do," Sibigtroth says. "But if IT understands the business, they can work more collaboratively." ◗

Brandel is a freelance writer in Newton, Mass.

Energy

It is at the heart of our work, not only the energy we provide to the entire world, but also the energy which drives our people. The following represents our needs in Saudi Arabia:

EDP Applications Systems Analyst/Specialist

Requires a B.S. or B.A. in Computer Science or Management Information Systems with SAP/Oracle experience in a SUN UNIX environment to include OS command line, VI editor and NS knowledge. Candidates must be able to troubleshoot R/3 system start/stop, run time and performance problems; install, troubleshoot and configure new releases of R/3 system; implement and troubleshoot R/3 (SAPGUI) desktop components; use R/3 performance tools to monitor DB and SAP software for resource constraints related to DB; configure CCMS.

EDP Systems Analyst

Requires a B.S. or B.A. in Computer Science or Management Information Systems with 5+ years experience developing and implementing computer systems and procedures within an information technology environment as well as knowledge of SUN hardware platforms. Position is responsible for maintainIng a UNIX environment and performing Solaris System Administrator functions supporting 24x7 SAP R/3 environment; setting up and managing NIS, DNS, SNMP, NFS, Automounter, patch installation, configuration, system test, documentation, troubleshooting, and installation of SUN OS and Solaris systems, and application software; performing hardware configuration, testing, and documentation of E10000 Enterprise servers and other middle range servers to support production SAP/R3 environment.

EDP Systems Analyst

Requires a B.S. or B.A. in Computer Science or Management Information Systems with 10+ years experience in computer systems with Enterprise 10000 and System Service Process (SSP) Administration, including performing sizing and configuration of domains. Must possess operation and maintenance skills on non E-1000 servers such as E-4500 and E-450 servers, expertise with SUN HA Cluster set-up/troubleshooting, Solaris UNIX skills including performance, tuning and networking, and Veritas Volume Manager. Experience in ATM and Gigabit Ethernet network interfaces with knowledge of network topology and protocol such as ATM, Ethernet, TCP/IP, Bourne and C shell scripts writing, and BMC monitoring tool is essential as well as knowledge of system security with background of UNIX scheduling product and its interface with mainframe scheduling.

EDP Applications/ Systems Specialist

Requires a B.S. in Computer Science or Engineering with 12+ years experience in IT applications, systems analysis and programming to include 5 years in a specialized field such as GIS/Mapping, CAD/CAE Engineering, Document Management and Web development. In addition, candidates must possess expertise in development and implementation of enterprise solutions relating to databases, networking, operating systems, and system security. The ability to sell ideas/solutions to senior levels of management in the development of business justification is desired.

EDP GIS Systems Analyst

Requires a B.S. or M.S. in GIS/Computer Science/Information Systems or a related discipline with 10 years of experience designing and producing maps and other graphic products using a geographic information system and other computer programs. This position programs specific applications and tools through Windows based Object Oriented and Web based languages for use in entry of geographic information, data analysis, map production, report production, and enhancing existing programs to meet current requirements; creates and maintains databases; captures data in different formats using electronic data recorders, global positioning system equipment, digitizer, and other means; analyzes GIS needs of user departments and implements GIS programs, databases, maps, and related products.

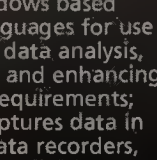
EDP Applications/ Systems Specialist

Requires a B.S. in Computer Science, Information Systems or Engineering with 12 years of IT experience including at least 8 years specializing in structured analysis, design tools and techniques. In addition, candidates must have: 3 years experience designing client/server systems, distributed systems and system integration with a strong background In a variety of operating systems such as Windows NT, UNIX, and IBM mainframe; 3 years experience developing client/server applications using Power Builder and PFC; 2 years experience developing WEB applications using Microsoft technology including Microsoft Active Server Pages (ASP), Microsoft Transaction Server (MTS), Active-X Components and Seagate Crystal reports. A background with relational database management systems, preferable Oracle, is required. Exceptional written/verbal communications skills and the ability to work independently across multiple and geographically distributed organizations are preferred. Programming with C++, JAVA, Internet Information Server, website development, HTML, XML a plus.

EDP Applications/ Systems Specialist

Requires a B.S. in Computer Science, Engineering, or Business Administration with 12 years experience managing a large help desk or awareness team to ensure the maximum utilization of computer applications, software solutions, and other Information Technology services by user organizations. Technical knowledge of Internet, Intranet, Windows, UNIX, software, hardware and network architecture is preferred.

For a detailed description of the above positions, please refer to our website www.jobsataramco.com. For consideration, please send a resume to Aramco Services Company, reference code 06S-COMPW, in one of the following ways: E-mail: resumes@aramco.com (please cut and paste rather than send an attachment); Fax: (713) 432-4600; Mail P.O. Box 4530, Houston, TX 77210-4530.



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Senior Software Engineer, responsible for performing high level specification, design, code & test of software for Intelligent Network (IN) products. Requires knowing, & being able to apply optimal Software Engineering theories/techniques to produce highly efficient (optimal performance) real-time software for large scale telecommunications applications. It also requires, but is not limited to, a very detailed use of (1) telecommunication protocols (example SS7, ATM) to enable intersystem communication; (2) OOA/OOD methodologies (Unified Modeling Language [UML]), concepts (encapsulation, inheritance, & polymorphism) & design patterns, such as visitor design pattern; (3) expert C++ coding to enable system design/implementation which is reusable, easy to maintain & efficient; (4) EIA/TIA specifications on IS41 & IS53 to enable the development of systems which will work in an open (multi-vendor) environment. The job will also require strong technical leadership skills. Utilize principles of Computer Communication Networks; Principles of Operating Systems; Database Systems; Analysis of Algorithms; Object-Oriented Software Development; Advances in Databases. Must have a Master's in Computing and Information Science or Computer Science. Six months experience required as Senior Software Engineer or six months experience as Teaching Assistant and/or Assistant MIS Director and/or any combination thereof. Course work must have included: computer communications networks; principles of operating systems; database systems; analysis of algorithms; object-oriented software development; advances in databases. Experience must have project experience implementing (1) object-oriented concepts (polymorphism, encapsulation, inheritance) to design a database query system; (2) designing and coding in C++ algorithms to achieve efficient system performance, (3) advanced object oriented design patterns, including visitor design pattern, to produce reusable software components. 40 hours per week, 8:30 a.m. to 5:00 p.m., $75,000 per year. Applicants must show proof of legal authority to work in the U.S. Apply at the Illinois Department of Employment Security, 401 South State Street - 7 North, Chicago, Illinois 60605; Attention: Joanne Breaux, Reference # V-IL 24523 - N. An employer paid ad. No Calls - Send 2 copies of both resume & cover letter.

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Prepare computer programs and detailed program specifications to support Pfizer Global Research and Development's Clinical Systems Department in Ann Arbor, Michigan. Specifically, you'll code sophisticated programs from detailed specifications, prepare test data and conduct program testing, and develop and modify program specifications according to department standards and system design documentation. You'll also perform emergency and planned maintenance on complex computer systems. Other activities will include testing operational programs of computer systems, preparing system modifications and integrating them into production operation, and participating in defining systems requirements during systems development. This position requires a BS in Computer Science and 2 years experience as a Clinical Analyst or as a programmer or analyst. Your experience must include clinical trial reporting systems (SAS) and ORACLE to code and test clinical data and system validation for the entire life cycle. 40 hrs/wk, 9:00 am to 5:00 pm, M-F, $61,000.
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COMPUTER/IT
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Software Engineer - 8am to 5pm, 40 hrs/week, $67,000/yr. For financial & cash card related industries: Provide architectural consulting services for customization of wire transfer software products utilizing Tandem Base 24 Point of Sale Systems. Evaluate client systems needs to design, code, test & maintain specialty software programs that impact specific banking & financial applications. Supervise disaster recovery procedures for on-line & off-line systems & develop automated change control procedures for wire transfers. Minimum Requirements: 6 yrs related experience in Computer Engineering or as a Computer Analyst. Related experience must include Tandem platform & Base 24 applications. Position requires annual relocation to various undetermined locations within USA. Apply at the Texas Workforce Commission, Dallas, Texas, or send resume to 1117 Trinity, Room 424T, Austin, Texas 78701, JO#TX1180559.

Software Engineer - 8am to 5pm, 40 hrs/week, $72,000/yr. 8am to 5pm, 40 hrs/week, $72,000/yr. On Tandem System, perform the following systems management duties: Install hardware/software required to maintain & upgrade Tandem mainframe; Conduct capacity planning, performance tuning, & SYSGENS; Evaluate, design, develop & implement Disaster Recovery Plan to insure security/ integrity of Tandem database; Evaluate, design, code, test, & maintain programs using COBOL 85, SCOBOL, & TAL. Requires Bachelor degree in Computer Science, Engineering, Mathematics or Electrical Engineering & 5 yrs. experience in the job offered as set out above. Position requires annual relocation to various & undetermined locations in the USA. Apply at the Texas Workforce Commission, Dallas, Texas, or send resume to the Texas Workforce Commission, 1117 Trinity, Room 424T, Austin, Texas 78701, J.O.# TX1101926.

Senior Programmer/Analyst to design, develop, test and implement computer software applications on an HP3000 system, using COBOL, Powerhouse, SUPRTOOL, and a managed care software package, to support the Company's healthcare management business, and provide user support. Requires an Associate's or equivalent-level degree in Information Systems, Computer Science, Statistics, Engineering or a closely related field, at least two years of experience with HP3000 and SUPRTOOL, and at least four years of experience with COBOL. Successful candidate must be able to perform job duties on date of application. Qualified applicants must presently be eligible for permanent employment in the United States. Salary $57,200 per year, plus employee benefit plan. Send resume and details of experience to Cynthia Jansky, Human Resources Manager, 7711 Carondelet Avenue, Suite 800, Clayton, MO 63105. An Equal Opportunity Employer.

Software Engineer
For Melbourne, FL employment. Responsible for the development of real-time embedded software for railroad electronics. Work w/program managers & system engineers to perform requirements analysis & definition. Design, code, integrate, test & debug real-time embedded software. Perform task identification & effort estimation for schedules & the development of software specifications. Travel to customer facilities. Provide technical & cost proposal input for existing product enhancements & new product definition. Requirements: Bachelor of Science degree in Computer or Electrical Engineering or Computer Science. 1 year exp. in the job offered or 1 year exp. designing systems & programs using real-time operating systems. 1 year exp.: programming in C or C++; & w/synchronous & asynchronous communication protocols & closed loop control. Knowledge of railroad & locomotive systems. 40 hrs/wk. 8:00 am to 5:00 pm. $62,600/year. No OT pay. To apply mail resume w/copy of ad to Kelli Stansbury, GE Harris Railway Electronics, L.L.C.,1990 W. Nasa Blvd., Melbourne, FL 32904.

Software Engineer - 8am to 5pm, 40 hrs/week, $65,000/yr. On UNIX platform, analyze, design, & develop software; Use Oracle & SOL server for database setup; Develop automation scripts for testing on UNIX platform using UNIX Shell Scripts & automating applications developed under Powerbuilder using Winrunner tools; Carry out testing Web-based applications under JAVA language with Applets & Servelets. Minimum Requirements: 5 yrs experience in job duties as set out above or in lieu of such experience, 5 yrs of related experience as a Systems Analyst. Related experience must include Oracle, UNIX Shell scripts, & SOL & JAVA languages. Position requires annual relocation to various undetermined locations within U.S.A.. Apply at the Texas Workforce Commission, Dallas, Texas, or send resume to 1117 Trinity, Room 424T, Austin, Texas 78701, JO#TX1180507.

GAMMA SOFT INC. headquartered in Suwanee GA, is a provider of Software solutions for common business environments. Gamma Soft maintains development of staff for in-house custom product development as well as consultants who can travel to various client sites across the country. Our clients include IBM, Windsor Group, Mitsui Osk lines, Fritz Corporation and Buckman Laboratories.

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Programmer Analyst - Legacy Systems (AS/400) - Multiple Openings
Systems analysis, design, development, testing, debugging, quality assurance, integration, implementation, post implementation support & conversion of complex on-line client-server based accounting, inventory, manufacturing, finance & other business application systems using Relational Database Management Systems (RDBMS), Fourth Generation Languages (4GLs) and other software utilities in a multi-hardware/multi-software environment including IBM mainframes, mid-range and PC systems. B.S. in Computer Science/Math/ Engineering/Science/Business - Commerce (or equivalent) and 1 yrs. experience in job offered or as a Software Engineer/Systems Analyst are required. Must have appropriate combination of skills as follows: 3 of B; or 2 of B and 1 of C; or 1 of A and 2 of B. A) includes software packages BPCS, MACPAC, MAPICS; B) includes languages RPG/400, CL, COBOL/400, SOL/400, Ouery/400, C; and C) includes communication/ CASE Tools APPC, APPN, SYNON, AS/SET. High mobility preferred. 40 hrs/week, 8 am - 5 pm. $53,098 - $75,000 per year. Qualified applicants should contact or send resume to Ms. Mary Pat Curran, Supervisor, McKeesport/Allegheny Co. CareerLink, 345 Fifth Avenue, McKeesport, PA 15132-2600. Refer to Job Order # WEB 150494.

Systems Analyst/SAP – (Franklin Park, IL) Using UNIX & Oracle database systs w/SAP R/3 software & ABAP/4 language, anal high & low level design specs, create & test objs of varying complexity & assure that screens, routines, functions & modules meet design reqmts; define & dev SAP basis specs utilizing detailed flowcharts, block diagrams, charts & layouts; create, dev, establish & doc SAP methods, procedures, approaches & stds working w/basic & advanced application systs design techniques; coord, dev & design software solutions; confer w/Business Analysts to study effectiveness of systs flow, data usage & manual/auto processes to identify reqmts; coord interface devlpmt & construction w/co headqtrs; use state-of-the-art devlpmt tools, prgrmmg techs, prob solving techs & computing equip; recognize & ident potential areas where existing policies & procedures req chnge or need to be developed, asst with the design, construction & interface devlpmt of an intl Web site, 35 hrs/wk, $90,000/yr; Bach's deg in Math, Comp Sci, Elec Engrg, or MIS & 2 yrs exp in job or 2 yrs exp as Systs Analyst. Applicants must show proof of legal authority to work in the U.S. Send resumes to Illinois Dept. of Employment Security, 401 So. State St – 7 North, Chicago, IL 60605, Attn: Bert Grunnet, Ref #V-IL24807-P; an employer paid ad, no calls; send 2 copies of both resume & cover ltr.

Internet Application Developer. 37.5 hours per week from 8:30 A.M. to 5:00 P.M. Rate of pay $3,416.66 per month.

Employee will develop an Internet Chicago, Illinois application with access to a relational database using the following tools: JAVA, C, C++ and using the following operating systems: Unix, Windows NT. Responsibilities include full life cycle development, analysis, design and development of the application data modeling, architectural requirements, and development of software. Databases used will be Oracle and Sybase and TCP/IP Protocol.

Minimum qualifications are a Bachelor of Science Degree in Computer Science and 1 year experience as a Internet Application Developer or 1 year experience as a Programmer using Unix, C, Oracle, and TCP/IP. Applicant must show proof of legal authority to work in the U.S. Send resumes to: Illinois Department of Employment Security
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Reference #V-IL 24043-L
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TECHNICAL SERVICES MANAGER to perform detailed study and analysis of business processes of client companies with a view to recommend IT-based business process re-engineering strategies of optimizing efficiency; Establish work plan and staffing needs for business process re-engineering and software development projects, and arrange for the technical recruiting and assignment of project personnel; Direct and coordinate activities of personnel working on various client projects; Confer with project staff to outline workplan and to assign duties, responsibilities, and scope of authority; Confer with project personnel to provide technical advice and to resolve problems utilizing technical background in business process re-engineering; Technical skills to be utilized include VisualBasic, HTML, MS SOL Server, Windows 95/98/NT, and Local Area Networking using TCP/IP protocols. Require: Master's degree in Computer Science/Engineering, Business Administration, or a closely related field, with two years of experience in the job offered or as a Project Manager. Competitive salary offered. Send resume to: Bob Ghosh, CEO, Infoquest, Inc., 3865 Lawrenceville Hwy., Suite 102, Lawrenceville, GA 30044; Attn: Job JH.

Mphasis-BFL Ltd, and its subsidiary Mphasis Corporation has multiple openings for the following positions at its CA offices in Santa Monica & Sunnyvale; New York:

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Faculty Positions

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Department of Computer Science and Information Systems

Marist College

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Marist College invites applications for the following two non-tenure track CSIS faculty positions:

- **Director of Computer Literacy/Lecturer in Computer Science and Information Systems**

The Director will be appointed as a professional lecturer on a tenure ineligible contract. The Director will teach nine-credit hours per semester, and coordinate and develop the literacy offerings for the College. The School offers these courses as part of the college-wide requirements that students have proficiency in the areas of computer hardware, software, multi-media, MS Word and Power Point, MS Excel, MS Access and Internet. The successful candidate must be expert in MS office and be able to teach the aforementioned courses/modules. In consultation with the Chair of the CS/IS department, the Director will schedule and staff the literacy modules, and will orient, provide in-service assistance to, and evaluate the part-time faculty teaching the literacy courses. Responsibilities also include coordination with administrative staff for hardware/software availability and with Registrar for scheduling of computer laboratories. An earned doctorate is desirable for this appointment and a Master's degree is required.

- **Laboratory Coordinator/Lecturer in Computer Science and Information Systems**

The Coordinator will be appointed as a professional lecturer on a tenure ineligible contract. The successful candidate will be responsible for maintaining a number of the School's laboratories, and will teach two courses a semester. Responsibilities will include: installing and updating software, installing hardware components, and providing network services such as print services, file sharing, web services, FTP services. An important task of this individual will consist of preparing reports for laboratory upgrades on an annual basis with a view to maintaining relevancy with rapidly changing technology and supporting the continually changing instructional needs as determined by the departmental faculty. Responsibilities also include coordination with administrative staff for hardware/software availability and with Registrar for scheduling of laboratories. The successful candidate will have experience in teaching laboratory classes and a Master's degree in computer-related areas is required.

Teaching excellence is one of the distinguishing characteristics of Marist College. Marist is a leader among small liberal arts colleges in integrating technology into teaching and learning. It has multimedia development labs for faculty and students. A state-of-the-art digital library facility was recently completed.

The Marist College technology infrastructure was developed through a joint study with the IBM Corporation. Currently the College is in the second phase of the joint study. Research is being conducted in the areas of streaming media, digital library, and e-commerce applications. Marist has also established a major Linux Research and Development Center and is in the process of establishing a special training program in an S390 environment. Marist is also leading major efforts to train professionals in e-commerce with on-line courses in Linux, Java, XML, C++ and others. Marist College is located on the scenic Hudson River and only 90 minutes away from New York City. It enrolls approximately 3,800 full-time and 1,700 part-time graduate and continuing education students. Candidates are encouraged to visit our home page at http://www.marist.edu.

Review of applicotions will begin Morch 1, 2001 ond continue until the positions are filled. A letter of application olong with a curriculum vito ond the nomes of three professionol references should be oddressed to:

MARIST COLLEGE

Onkar P. Sharma, Dean
School of Computer Science and Mathematics
MPO-905/CW, Marist College
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Senior Software Engineer. Will assist in the development and maintenance of the company's TM1 Multidimensional Database Engine. Will perform coding, testing and debugging of current and future TM1 products. Will be involved in product design and high level customer support both on and off site. Requires: M.S. in C.S., Engineering or any other quantitative field. Must have knowledge of C/C++, GUI, Multi-threading, networking and system programming using MS VC++/MFC on Windows NT platform. 40hrs/wk (8-5); $71,400.00/yr. Send two resumes/ responses to: Case Number 20004561, Labor Exchange Office, 19 Staniford Street, 1st Floor, Boston, MA 02114.

Software Engineer: Create customer resource management systems by designing and developing specialized software using SIEBEL, SCOPUS, Visual Basic 6.0, and Oracle in UNIX and Windows environments. MS in Comp Sci, Comp Engg, Elec Engg (or equiv) or BS in Comp Sci, Comp Engg, Elec Engg (or equiv) and 5 yrs exp. Send resume: HR Dept., Internet Information Systems, Inc., 120 Wood Av. South, Suite 300, Iselin, NJ 08830.

Banking

MBNA Hallmark Information Services, a subsidiary of MBNA, the world's largest independent credit card lender, is accepting applications for several **Senior Technology Analyst** positions.

Duties: Develop and enhance new applications. Maintain up-to-date awareness of current and future direction of internal division and business unit strategy. Identify areas for improvement in the production environment and work with management to implement these improvements. Act as project lead to assist staff in the development lifecycle and mentor other developers in the development methodology. Assist management and business area staff to define and validate application requirements. Create and maintain appropriate support documentation and review other developer's documentation.

Requirements: Four-year college degree or equivalent; minimum of 3 years of related experience in maintenance and development of software applications; experience with Microsoft C++, Visual Basic, PowerBuilder, or related development applications and tools; and experience with Unix and NT operating systems and application development software.

Please forward your resume and a cover letter, referencing source code NA991050A, to Ms. Sharon Alexander, MBNA Hallmark Information Services, 1100 N. King Street, Wilmington, DE 19884-2234.

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Systems Analyst,Trading Systems-Investment Management firm seeks System Analyst with experience in graphics/GUI programming and Unix Systems Administration to provide software and hardware support for computer system utilized by trading room. Duties include development,enhancement, maintenance & support of trading room customized software & developing software interfaces linking the trade desk with research & accounting groups. Required:Master's in Computer Science; 6 months experience or 6 months as Programmer Analyst. Salary according to experience. Send resume to RTC, 600 Route25A, East Setauket, NY 11733, ATTN: HFHC4

Full-time BIOS Engineer. Responsible for BIOS customizations, isolating BIOS problems. Responsible for the release of BIOS releases. Establishes customer relations. Write and maintain technical documents using Microsoft Office, Assembly Language, AHDL, VHDL, C/C++, Visual Basic, MATLAB in DOS, UNIX, and Windows. Works with assembly language training programs, development system, test system, and any computer hardware and software necessary to reproduce customers' problems. Must have 3 yrs exp. in job offered or a position with the same duties. Must have a Master's degree in Electronics Engineering. Salary: $65,940/yr. Send resume to: Nanda Chheda, AMI, 6145-F Northbelt Parkway, Norcross, GA 30071.

Webtel Systems is seeking individuals for the following position to work at job sites throughout US:

Programmer Analysts to develop various software applications. Req: BS in Computer Science, Engineering or related field and one yr exp.

Sr. Application Developer to research, analyze and implement major ERP packages for various industries. Req: MS Computer Science, Engineering, MIS or related field or equivalent and one yr exp., & knowledge of Oracle 8 or 8i, PL/SQL Developer & Designer 2000.

Send resume to: Webtel Systems, 360 Tolland Turnpike, Ste., 1A Manchester, CT 06040
jobs@webtelsystems.com

Software Engineers, Programmer Analysts, Database Analysts needed by MA. based IT firm. Please apply with 2 copies of your resume to H.R. Department, (Enterprise People, Inc., 109 Mayfair Drive, BoxBorough, MA 02188

Banking

MBNA Hallmark Information Services, a subsidiary of MBNA, the world's largest independent credit card lender, is accepting applications for several **Software Engineering** positions.

Duties: Develop and code new applications. Maintain legacy applications. Resolve problems with production applications and monitor application performance. Analyze and evaluate business requirements and assist with project planning and walk-throughs. Create and maintain appropriate support documentation and ensure strict adherence to Corporate and departmental policies and procedures.

Requirements: Four-year college degree or equivalent; minimum of 2 years of related experience in maintenance and development of software applications; experience with Microsoft C++, Visual Basic, PowerBuilder, or related development applications and tools; and experience with Unix and NT operating systems and application development software.

Please forward your resume and cover letter, referencing source code NA991050, to Ms. Sharon Alexander, MBNA Hallmark Information Services, 1100 N. King Street, Wilmington, DE 19884-2234.

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Some positions also require a Bachelors degree, others Masters Degree. Equivalent degree and experience is also accepted. Excellent Pay and Benefits. Please indicate the position applied for. Mail resume to: HR Dept., Databased Solutions, 100 Jersey Avenue, Suite B-101, New Brunswick, New Jersey 08901.

Web Developer-- For multimedia development co., responsible for consulting with the Marketing, Graphics & Projects Management Staff in team environment to design, develop & implement Web-based solutions for co.'s pharmaceutical clients. This incl. building & maintaining Web applications that interactively support clients training & marketing needs. Req: M.S. in Comp. Sci. or related field, 1 yr exp. in job offered or as Programmer/Analyst. Exp. must incl. multimedia programming with Visual Basic, VB Script & distribution of programs with InstallShield.; proficiency in Java, ASP, Javascript, Visual InterDev, SQL Server & Access. 40hrs/wk. Send resumes to Intellmedia, 220 Willowbrook Lane, West Chester, PA 19382

Software Engineer to research, design & develop computer software systems for manufacturing and other industries applying principles & techniques of computer science, engineering & mathematical analysis using various operating systems, C, C++ & OTHER PROGRAMMING LANGUAGES. Req. B.S. or Engineering degree in Computer Science/equivalent plus 6 yrs of exp. or Masters/equivalent in Computers & 2+ yrs. of exp. 18+ months exp. in C, C++, DOS, OS/2, UNIX, MS Windows, VAX/VMS & AIX. $70,000 p/a. Send resume to Playekar Companies, Inc., 1959 East Third St., Williamsport, PA 17701.

Systems Analyst - Needed immed. (2) to develop, code, test & maintain information systems & integrate with DB's for clients in NY/NJ area. Provide tech support as needed. Know Win NT, Oracle, VB, SOL. $80,000/yr. Bachelor's and 2 yrs. exp. in any IT field. Fax res. to 973-366-1536.

Full-time Associate Database Administrator. Responsibilities include: design, plan and install Oracle databases on UNIX and NT-based systems in a production environment primarily for financial institutions; plan communications connections to the UNIX and NT systems; install and configure high availability for SUN Solaris; insure that adequate documentation exists to operate and maintain systems; implement and execute capacity planning modeling, processes and tools; perform and tune recommendations; coordinate the implementation of new releases/ versions of systems software and the layout of data on disk drives for maximum performance; install software packages; maintain 24x7 operation; and participate in disaster recovery planning and testing. Must be proficient in Oracle Enterprise Edition 8 and 8I and SOL Server Version 6.5 & 7.0, Visual Basic, UNIX and NT operating systems, performance monitoring tools, and shell scripts in UNIX and database scripts in PL/SOL and TSQL. Must have an Associate of Science degree or foreign/educational equivalent in Computer Science, Engineering or related field and three (3) years of experience as a Database Administrator or related position, or a Bachelor of Science degree or foreign/educational equivalent in Computer Science, Engineering or related field and one (1) year of experience as a Database Administrator or related position. Must have proof of legal authority to work in the United States. Salary: $50,000.00 and up, commensurate with experience. If interested, submit resume in duplicate to:

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Software Co, Edison, NJ: Project Leader/Sr. S/ware Engg w/ expertise in Distribution & fin'ls to dsgn/dvlp & implmt ERP systems; work on AS/400, RPG/400, CL/400, C/C++ & Oracle; VB Knowl a+. Req MS or BS & 5 yrs exp or equiv in educ & exp. Competitive sal & benefit pkg. Reply to HR, krahi@hotmail.com or efax (509) 756-1431.

Computer Programmer: Murfreesboro, TN: design & develop computer programs for business applic., including Acct. Receivable & Payable, customer database, vendors, acct. reports & inventory control. Create Website. Train other workers to use programs. Utilize Windows NT & Auto CAD. Req: Bachelor's Deg. in Comp. Sci or related + 2 yrs exp. Please fax resume to: 615-896-7811.

Systems Analyst needed by fin'l firm in NY. Must have Bach Deg/Equiv in Comp Sci & 2 yrs exp in dsgng, dvlpg, testing, implmtg & supporting in-house business applics for municipal bond/structured finance industry. Skills reqd incl: Erwin, Gupta/ Centura, Seagate s/ware, Open VMS, Oracle Database, Case Modeling techniques, Object Oriented dsgn & prgmg, relational d/base concept & dsgn, PL/ SQL & C. Ambac is an EOE. Respond to Recruiting, HR Dept, Ambac Assurance Corp, One State St Plaza, NY, NY 10004.

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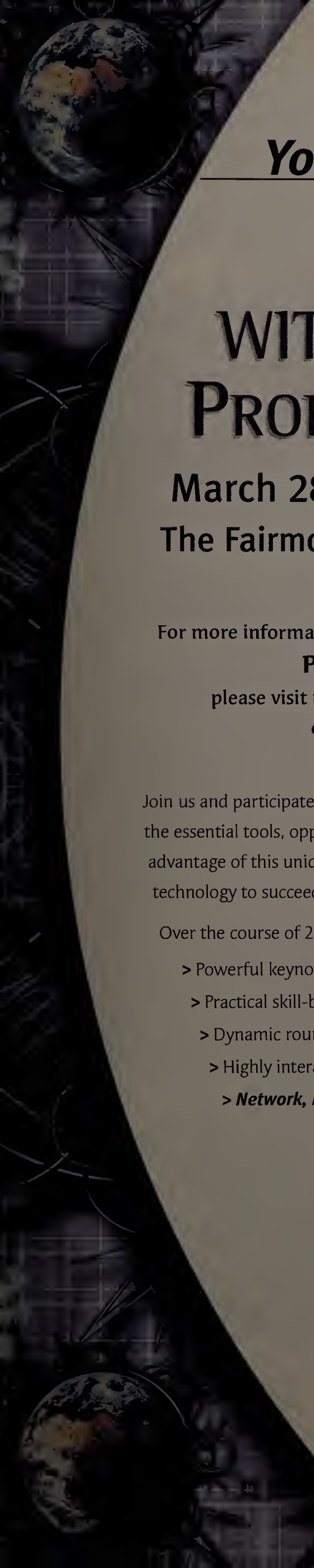

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Diversity - What You Need to Do to Tap "All" the Top Talent

PRESTON EDWARDS, IMDIVERSITY.COM

Top employers benchmark how diversity has become a core value to attracting and retaining top talent and keeping a competitive edge. Moderator, Preston Edwards, Chairman and CEO, IMDiversity.com, and Black Collegian Magazine, is nationally known for his 30 year commitment to diversity education. He has been honored by numerous organizations including the 1999 Pericles Award from the Employment Management Association.

What You Really Need to Know About Resume Management Systems or, How to Tell "Real Ware" from "Vaporware"

MARK MEHLER, MMC GROUP

The worlds most competitive corporations discuss the pros and cons of choosing and using emerging technology tools and systems. Moderator: Mark Mehler, President, MMC Group. Mark is an international consultant on high-volume staffing processes, a sought after speaker at national recruiting conferences and co-author of CareerXroads.

Town Hall Forum: Pundits, Puns and Pulled Punches

GERRY CRISPIN, CAREERXROADS 2000; JOHN SULLIVAN, AGILENT TECHNOLOGIES; KEVIN WHEELER, GLOBAL LEARNING RESOURCES; PETER WEDDLE, WEDDLE'S

Four internet recruiting pundits square off in a "no-holds" barred debate on the future of employment. Who are the winners and losers in the employment space?

Internet Recruiting Strategies - TOOLS Overview:

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Technology 2001

SUSAN HODGES, SEMCO

There is always something new going on in IT, but the new millennium seems even busier than usual. The internet is affecting everything that's being done and new products and skills appear daily. This session will look at the new technology in each critical area - platforms, development, data, communications and applications.

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Hot Skills: C++

C++ is among the leading languages of information technology in 2001. Industry leaders say the language remains critical in an IT world that is coming back after the past year with a different look, one where ever-bigger organizations will be using the web in still bigger ways.

Aztech Professional Services, Inc.
Phoenix, AZ

Kent Dicks started Aztech Professional Services five years ago, basing his business model on observed best practices when working at Texas Instruments and American Express. Though a relatively small organization of 100 employees, Aztech provides IT consulting and headhunting services to the Fortune 1000 and state agencies. A major Fortune 50 financial services company has recently named Aztech a nationwide, preferred vendor in nine U.S. cities.

"We stand side-by-side with much larger firms."

Kent Dicks
Aztech Professional Services, Inc.
founder

"We stand side-by-side with much larger consulting firms," says Dicks. "Our model allows for open and honest communication with our employees. There is no aspect of their contract employment that is not shared with them, including the bill rate to the client for their services."

Aztech employees pick and choose their benefits, including medical, dental, relocation, training, 401(k), paid time off, bench time and much more. Each employee receives a free Sam's Club or Costco membership and $250 toward a fitness center membership each year. "We want our employees to get the most out of their compensation plan," says Dicks. "If an employee already has benefits from an alternative source, like their spouse, then we pay them for the benefit."

While Aztech insists on a confidential agreement to protect client proprietary information, the firm does not require employees to sign non-compete agreements, which is widespread within the consulting industry. "A majority of consulting firms use non-compete agreements to handcuff their employees," says Dicks. "We think our approach makes for a much happier employee."

Aztech focuses on providing hard-to-find technology resources. The firm provides flexible resourcing for clients in a contract capacity. Should the client and contractor desire, a transition can occur to become an employee of the client company. "Many clients and contractors prefer this method of employment, because it allows both parties to work together before making a formal commitment to employment," says Dicks. "Our overall goal is to provide independent thinking and more experienced contractors for the dollar the client invests."

Currently Aztech works with clients in many capacities, including financial services, telecommunications, semiconductor and aerospace. A majority of Aztech's contractors are working in some form on strategic e-commerce projects, in either development, project management, architecture, security or systems administration.

Aztech will, in 2001, hire individuals with C++, C, Java and WebSphere technical skills, to name a few. "We make sure our contractors are in a challenging assignment, where they are able to learn and grow," says Dicks. "Aztech contractors ask for assignments that will expand their depth of knowledge, and provide more challenge. We don't just fit people into their routine mold. It's not about just making a sale, it's about building long-lasting relationships with the employees and clients. If an employee is happy in their assignment, the client is generally kept happy. It's a win/win.

"The market has changed dramatically over the last year. After Y2K, we expected and started to see such a demand on e-commerce skilled individuals. Contractors just entering the market with less than one year of experience were asking for six-figure salaries and stock options with pre-IPO dot-coms. Now with the failure of many dot-coms, the shyness of the venture capital firms to fund and the outsourcing to other countries, the e-commerce resources are in more supply. The emphasis has switched, and IT experts are more interested in getting their hands on state-of-the-art technology and experience, at least for the time being."

iPolicy Networks
Fremont, CA

iPolicy Networks has a business proposition that is resonating across the industry. A producer of purpose-built systems with proprietary technology, iPolicy Networks is developing a carrier-class product for service providers that allows them to deploy advanced IP networking services. "Our product will allow them to provide the service from their location as opposed to the more conventional approach of placing hardware at the customer premise," says Mark Housman, iPolicy Network's vice president of marketing.

Housman says this is the next generation. "It's the next step to build a purpose-built platform to operate at the service providers' edge," says Housman. "We're providing a multi-gigabit product that operates at optical speed."

Housman says the company will hire approximately 60 IT professionals with C++, C and Java expertise to develop its products, as well as developers for the embedded software. "We have a variety of positions open, and coming here will allow you to learn and participate in something as it develops. We're building a complete system, to include planning, development, design, architecture – all the way through validation.

"We are a start-up, but we're building a product that is in the sweet spot of this market space."

Mark Housman,
iPolicy Networks
vice president of marketing

"We are a start-up, but we're building a product that is in the sweet spot of this market space," says Housman. "We have a strong idea about how service providers can provide a deeper value for their customers. We also have a group of people who have done this – and have a proven track record, through the people who work here, for executing."

Housman says the company is a right fit for people who are energetic and who want to excel. "It's an opportunity for engineers to work on a leading-edge product, to advance their skills, as we do things that haven't been done before, and we have a lot of fun doing what we're doing."

ITcareers

For more job opportunities with programming firms, turn to the pages of ITcareers.
If you'd like to take part in an upcoming ITcareers feature, contact Janis Crowley, 650.312.0607 or janis_crowley@itcareers.net.
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XML

guesses that XML will be a technology that creeps rather than leaps into PepsiCo's business-to-business trading network, starting with smaller, limited jobs for which the company can see a return on investment.

Several companies with big EDI systems acknowledged that they're only investigating the use of XML tags in their electronic purchases and sales, despite the promise that the content-tagging language will make data more accessible and easier to manipulate.

"We're looking into XML, and it's something we want to pursue, but we're still not clear on how it's going to impact our business," said Paul Wadley, a senior EDI analyst at Pawtucket, R.I.-based toymaker Hasbro Inc.

Not Quite Ready

Many attendees at the conference echoed that hesitance about XML, noting that established corporations for the most part already have working supply chains.

Amy Hedrick, an analyst at AMR Research Inc. in Boston, said companies aren't going to abandon 15 years of EDI development to move to a system reliant upon XML, especially since there are no widely used standards for the data-tagging language and its more than 100 variants.

That's not to say XML is being completely ignored. Aerospace companies such as Seattle-based The Boeing Co. and Bethesda, Md.-based Lockheed Martin Corp. have been more active in forming electronic exchanges and supporting XML transactions.

"But you'd expect high-tech companies to be the first to embrace the technology," said Leo Lipis, an analyst at IDC in Framingham, Mass.

Gaithersburg, Md.-based GXS plans to support both established EDI networks and upstart XML initiatives — and its executives remain split as to when XML will prove a solid return on investment for businesses that have legacy systems and defined supply chains.

"We were told [by XML proponents] three years ago that XML will change our lives, and it hasn't happened yet," said Otto Kumbar, a vice president at GXS. He added that businesses are reluctant to marry themselves to any technology that "is fragmenting at Internet speeds."

"There's a lot of waiting going on," said Karen Peterson, an analyst at Stamford, Conn.-based Gartner Group Inc. "You're talking about a market that doesn't have standards or a lot of history."

Steve Scala, another GXS vice president, acknowledged that XML won't be standardized and ready for ubiquitous business use in the next year, but he warned that companies need to start preparing for its eventual ascendancy.

"I'll bet you if you ask any vendors if they plan to do any development using EDI, the answer is a big whopping goose egg," Scala said. "We know where this is headed, and it's toward XML."

Just don't expect the change to happen quickly.

"It's a matter of figuring out how the newer technology will interact with suppliers and with our back-office systems," said Larry Martin, manager of e-business development at New York-based Philip Morris U.S.A. "It's a big question, and we're really just starting to tackle it."

GE Customers Not Yet Sold on B2B Marketplace

EDI users express caution but some have confidence in GXS's experience, reputation

BY MICHAEL MEEHAN
ORLANDO

LAST WEEK, General Electric Co.'s Global Exchange Services (GXS) division gathered its biggest EDI customers here in an effort to build momentum for what it hopes will someday be an electronic world trade center.

But customers at the conference made it clear that they're not rushing toward any public electronic marketplaces and that GXS will need to prove that it can find the right marriage between trade and technology.

GXS has been in the trade game for 35 years in different incarnations. It currently boasts 100,000 electronic data interchange (EDI) customers, who last year conducted 1 billion business-to-business transactions using the GXS service.

Yet GXS executives envision growing the company into a sprawling Internet marketplace by providing the direct sale of services and goods in real time. To do that, Fairfield, Conn.-based GE will need to prove that it can stand toe-to-toe with technology heavyweights like IBM and Microsoft Corp. in providing the applications and business management tools needed to navigate these new marketplaces.

"We don't use [GXS] yet," said Bill Breusch, vice president of shared services at Princeton, N.J.-based pharmaceuticals firm Bristol-Myers Squibb Co. "And it's the technology piece we'll be watching most closely if we do join."

One thing GXS has going for it is gravity. GE is one of the world's biggest and best-run companies, and it gets noticed when it competes in any arena.

"Their reputation precedes them, and you have to take their size into account," Breusch said.

GE Has the Clout

"You go where the business is," said Jeremy Curtis, manager of e-commerce at Cincinnati-based produce company Chiquita USA, a GXS EDI user. "Wal-Mart has the dominance to create private exchanges on the retail end. General Electric's certainly got the clout to draw a lot of companies to a public exchange."

However, GXS CEO Harvey Seegers acknowledged that his company won't be able to draw business on the GE name alone.

"We're going to have to partner with best-of-breed providers to offer some of the things our customers are going to want," he said. "There's no way you can attempt to do it all yourself."

Some of those partnerships, announced at last week's conference, include new business-to-business enterprise management applications from Pittsburgh-based Entigo Corp.

Despite a rush by many corporations during the past year to create online trading hubs, Seegers said he believes it will take years for GXS to become the kind of mega-online marketplace he envisions, thus giving the company time to make its case.

"Big companies aren't going to change their trading patterns overnight — we're already seeing that," he said. "I think this is going to grow a lot less rapidly than some of the hype might suggest."

Leo Lipis, an analyst at IDC in Framingham, Mass., said GXS will have to make wise strategic technology partnerships to keep pace with its EDI rival IBM, which can develop much of its electronic-marketplace technology in-house.

"Obviously, GE's not going to sell people on being a tech giant, but they're known for providing high-quality services in [the business-to-business] area," he said. "It's going to take a lot of customer focus for them to succeed in creating this kind of marketplace."

Paul Wadley, a senior EDI analyst at toymaker Hasbro Inc. in Pawtucket, R.I., said his company's history of using

> I think this is going to grow a lot less rapidly than some of the hype might suggest.
>
> **HARVEY SEEGERS, CEO, GE GLOBAL EXCHANGE SERVICES**

GXS for EDI transactions will be a plus as it considers entering public online marketplaces.

"You want to stick with the players that are out there and tried and tested rather than some sort of cowboy outfit that comes and promises you everything and delivers nothing," Wadley said. "You want to be with someone who understands the new stuff and your legacy systems and who can help you fit them together."

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FRANK HAYES/FRANKLY SPEAKING

A Deal's a Deal

IT TOOK TWO TRIES, but United Air Lines got it right. For about an hour on Jan. 31, a foul-up on United's Web site (*www.ual.com*) created giveaway prices for tickets to Paris, Hong Kong and other international destinations. Example: San Francisco to Paris, $24.98. Before the problem was fixed, 142 people jumped on the almost-free fares. When United figured it out, the company decided not to honor the tickets.

But last week, United reversed course. To keep customers happy, the airline will honor those tickets, even though United believes it could legally back out of the deals.

Meanwhile, last weekend Staples.com was offering $39.99 briefcases for a penny (see story, page 12). Yes, it was another pricing snafu — one that had some customers ordering 50 briefcases or more. Some of the products shipped, but once Staples.com caught on, the company sent e-mails instead, informing customers that their orders had been canceled.

Staples.com won't say how much its unplanned 1-cent sale cost it. United is mum too, but 142 international tickets at, say, $700 each puts the price tag under $100,000.

That's not bad, considering that now United looks like an honest trader — while Staples.com looks like a bait-and-switch artist.

OK, maybe that's an exaggeration. But there's one cardinal rule when it comes to customer trust: *A deal's a deal.* Forget the fine print, forget what the lawyers say. If you offer customers an insanely great bargain and they accept the offer, they expect you to be as good as your word.

If you're not, they'll think you're a liar.

Is that fair? Maybe not. But it's what customers believe. In the old-fashioned, bricks-and-mortar, face-to-face world, a deal is a deal, an advertised price is a promise and someone who backs out is a cheat.

And if your Web business can't live up to that expectation, customers will go someplace else — someplace they can trust.

Which puts the IT people running Web businesses in a nasty bind. Pricing snafus happen. There used to be front-line employees and middlemen to catch those mistakes, providing real-time sanity checks on insanely low (or high) prices. But not on the Web.

You can — and should — build in more checks and double checks to catch those off-the-wall prices before they go online. But even with extra safeguards, mistakes will happen.

So when $25 airfares to Paris or 1-cent briefcases show up on your Web site, you'll need a plan. Of course you'll pull the plug on the bargain-basement prices immediately, but then what?

Who's going to figure out whether to eat the loss or bail out on the deal? Who's going to estimate the cost of almost-free goods and services vs. bad publicity, lost business and potential lawsuits? Who will make that decision?

> *Customers expect you to be as good as your word.*

You know this for sure: It shouldn't be anyone in IT. These are marketing issues, not technology questions.

The higher the potential costs, the higher in your organization the decision should be made. This is what CFOs and VPs get paid for. And the decision should be informed by the realities of Web business: how your reputation will fare, what customers expect, whether they'll trust you in the future.

United didn't have that process in place and almost fumbled the decision. Staples.com had a process in place — but whether it will cost more in customers than in briefcases, only time will tell.

Make sure *your* company is ready for price snafus, too — all the way to the top. Because when it's your reputation and your customers' trust on the line, you'll want to get it right the first time. ◗

Hayes, Computerworld*'s senior news columnist, has covered IT for more than 20 years. Contact him at frank_hayes@computerworld.com.*

SHARK TANK

TECHNICALLY ACCURATE A server isn't responding, so IT pilot fish calls the remote site and asks a non-IT staff worker, "What's on the server's screen?" Staffer glances across the room and replies, "A potted plant."

I WANT MY TCP User in the business office of a ski resort complains that his network connection isn't working, so IT pilot fish checks the network patch panel, which is right next to the resort's canned-music receiver. It takes a while, but he spots the problem: "Someone carefully split the Ethernet pairs and painstakingly grafted an audio speaker onto one pair," says the fish. Seems they thought they could pick up one of the music channels through the network. "But I can tell you," the fish says, "IP sure doesn't sound like much."

POLICE DEPARTMENT IT pilot fish gets an unusually clueless phone call from an IT market research outfit. Among the questions: "Are you involved in Internet interrogation?" "I'm pretty sure she meant integration," says the fish, "but Internet interrogation could be pretty handy in our line of work."

THIS IT SHOP is supposed to handle all PC moving, but one user is in a hurry, so she hauls her PC to the new office herself. When she's done, everything is connected, but the screen is blank. IT pilot fish checks it out and discovers she has managed to cram the monitor cable's DB-15 connector into the video card upside down. How did you manage that? he asks. "I had to jiggle it around," she concedes, "but the screws finally tightened down."

UNCLEAR ON THE CONCEPT Before taking a server off-line for repairs, IT pilot fish backs up its marketing contact database onto a CD-ROM. Marketing VP directs fish: "Be sure that the database file is marked 'shared' so we can access it while the computer is down."

Share something: **sharky@computerworld.com**. You get a sharp Shark shirt if your true tale of IT life sees print – or if it shows up in the daily feed at *computerworld.com/sharky.*

The 5th Wave

E-mail richtennant@the5thwave.com

"I'm using the 'Cab Driver's' edition of NaturallySpeaking, so it understands words like '[illegible]' and '[illegible]!'."

COMPUTERWORLD 100 BEST PLACES TO WORK IN IT 2001

Let Us Know...

What Makes You Such a Great Employer?

Why is your company a best place to work for IT Professionals?

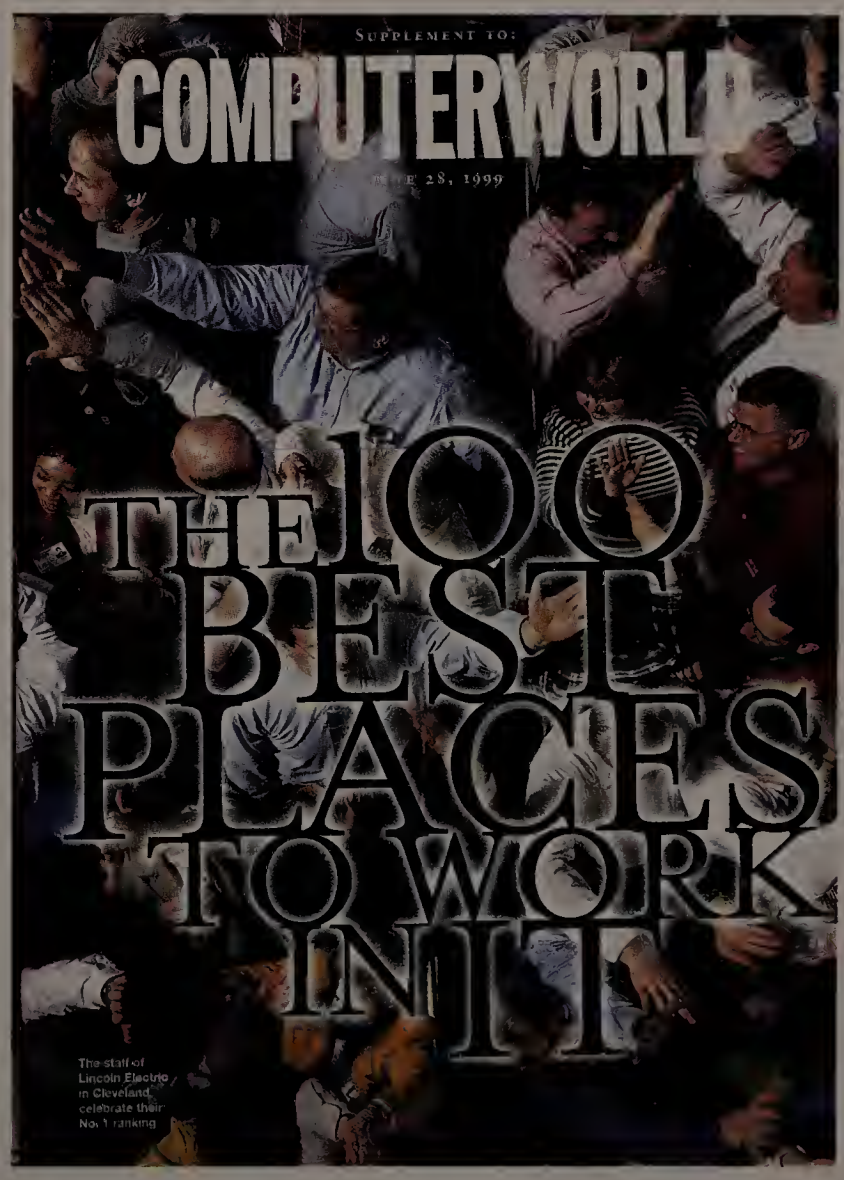
Computerworld is again conducting its annual survey of the **100 Best Places to Work in IT,** and invites companies to visit our web site, participate in the survey, and tell us why you are clearly among the very best places to work for IT professionals.

Results of the survey will be published in the June 4, 11, 18 and 25 issues of Computerworld as a special series, each week looking at different aspects of what makes for a top employer in information technology.

Best Places to Work in IT are those that excell at:

- **Exciting technology projects and work**
- **Training and education investments**
- **Diversity hiring and advancement**
- **Benefits and compensation**
- **Retention and employee job satisfaction**
- **Career and skills development**

If your company measures up, tell Computerworld readers your story, and what have been the secrets to your success.



The 100 Best Places to Work in IT survey questionnaire, with instructions and methodology, is available on Computerworld's web site during the month of February and March. Go to www.computerworld.com

100 Best Places to Work in IT, 2001

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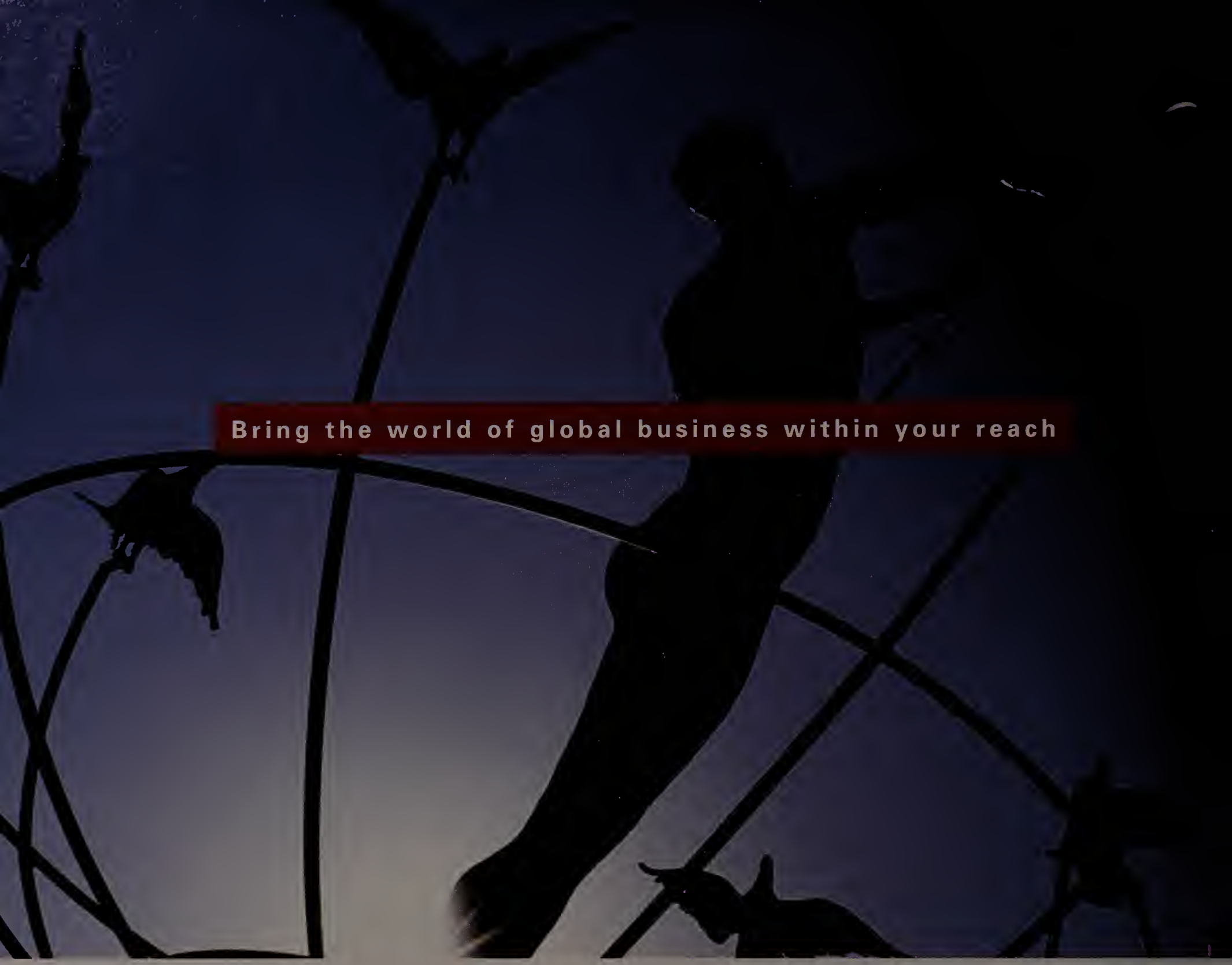

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